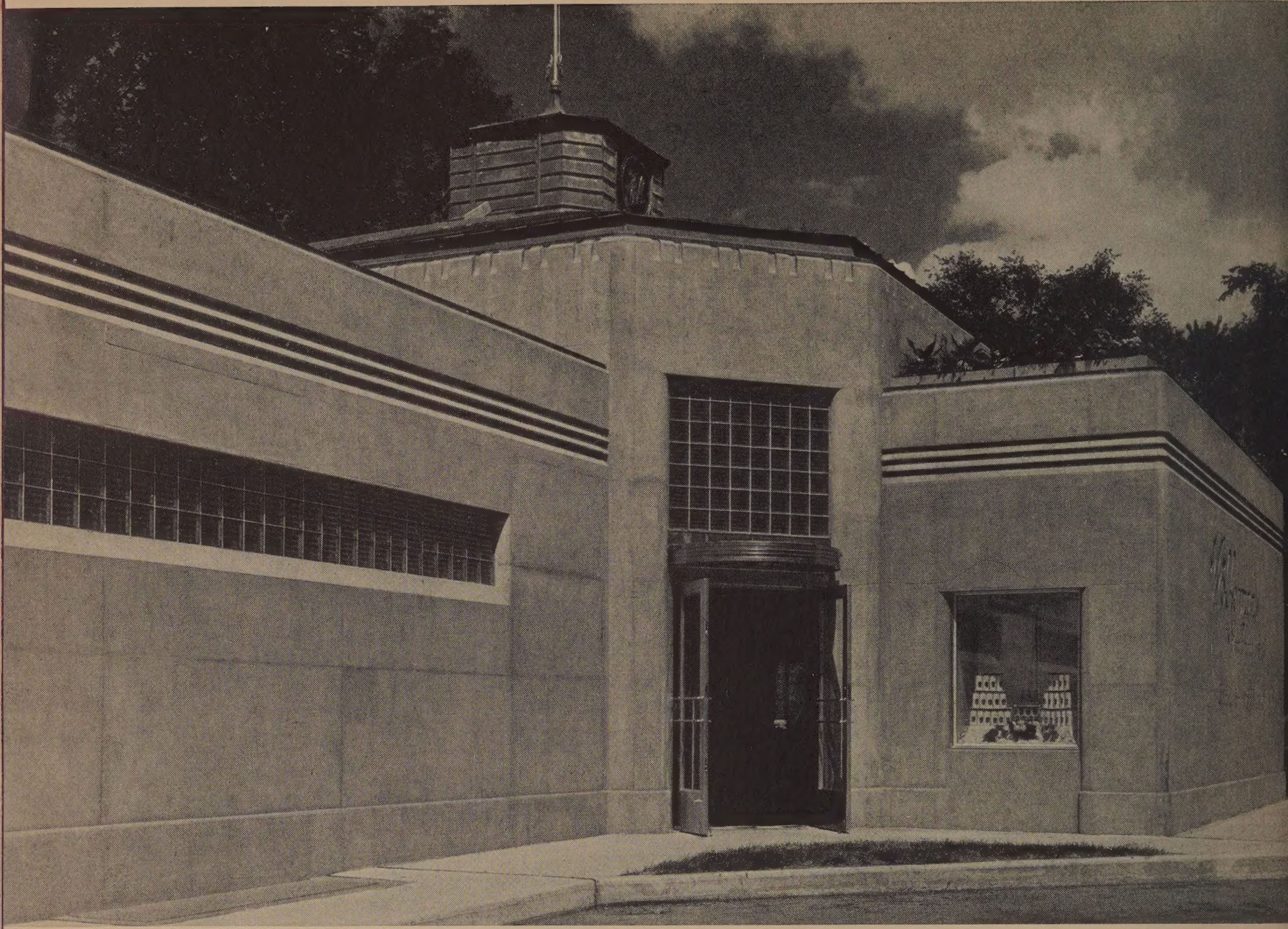
# ARCHITECTURAL CONCRETE

VOLUME THREE NUMBER FOUR



WOLFERMAN BUILDING
Kansas City, Missouri

Edward W. Tanner, Architect

H. A. Noble, Engineer

Long Construction Co., Contractor

*No one healthy enough to enjoy a hearty meal can remember the time wher "Wolferman's—Good Things to Eat" was not the byword for fine tabl shopping in Kansas City, Mo. Established in 1888 and eminently successfu ever since, Wolferman's now occupies a new landmark—an architectural concrete building of unusual design. Patterned for exacting customers, it is designe for efficiency and dignified appearance. (See front cover).*

# Architectural CONCRETE

## Wolferman's—Open for Business

By Edward W. Tanner, A.I.A.

WHY was architectural concrete chosen as the principal material of construction for the new Wolferman Building in Kansas City?

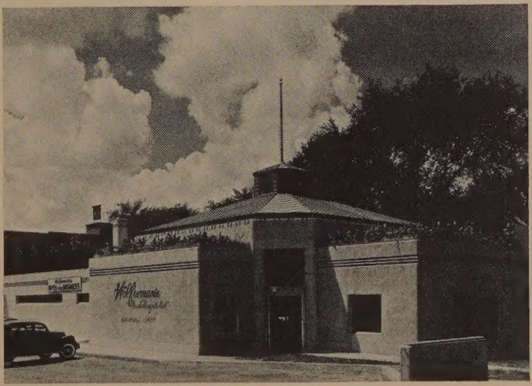
The answer to this question is probably the most interesting comment that the architect can make about this structure. Here, for once at least, basic problems pertaining to a given structure were decided to the satisfaction of the architect by a logical development of studies starting with the site, progressing through peculiar requirements of space and arrangement, and ending with the development of an exterior that honestly and simply expresses the plan.

In undertaking the design, the architect felt an unusual responsibility—for the owner is a man of such excellent taste who has succeeded so well in his business that his new building simply had to live up to him and his work. The business is an old one, and its reputation unexcelled. Nevertheless, the owner is very progressive and, even to the point of being revolutionary, is always trying to improve everything.

After spasmodic attacks on the plan, running over a period of several years, the final layout was decided upon and the plan developed accordingly. The plan, itself, is revolutionary in that the various entrances to the store were located with particular reference to the parking station and not directly on the abutting main streets. Furthermore, the plan was evolved so that the three entrances led to the main sales area at equally important points. The sales area is a large room with four alcoves, each housing one of the regular departments.

All of this planning was done with intent to provide maximum efficiency. There were no compromises and no modifications made for the sake of exterior appearance.

Only after the plan had been developed to the satisfaction of all concerned, were studies of the exterior started. And it was soon evident that the unusual plan called for a general treatment that would differ widely from the orthodox. The more commonly used materials of construction and architecture were tried with indifferent success, and then the possibilities of architectural concrete were explored. Things then began to click. This material solved the various construction problems—it seemed to fit most properly with the plan and the general *feel* of the

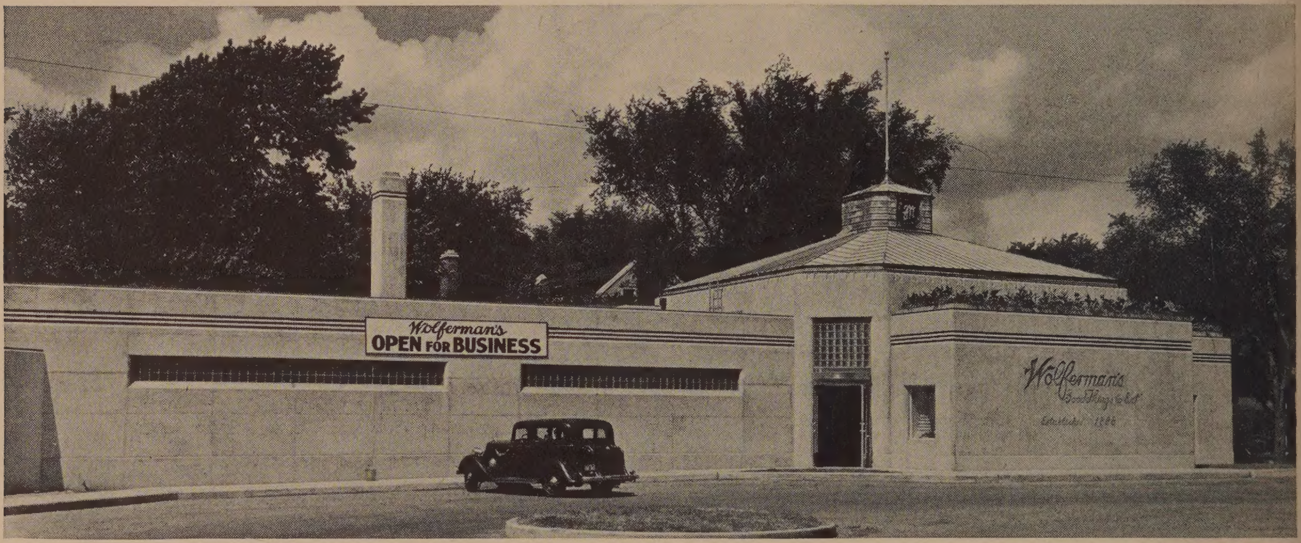


building. The architect felt that this material was most appropriate for the project and the owner was easily convinced, for he saw the possibility of a building that would express his ideas of both soundness and progress.

Once this bridge was crossed, the details were carefully studied. All design was based on the adaptability of this plastic material to easy, flowing lines. The architecture is strictly functional, for no effort was made to express the exterior as other than a pleasing, dignified enclosure for an efficient interior plan.

Proper handling of signs has always been one of the hardest problems in the execution of commercial structures. Signs are necessary; they must be recognized, but it is generally very difficult to make them fit the design of a building. In this structure, architectural concrete presented a splendid opportunity for an integral reproduction of the fine trademark of the firm. The incised lettering made by insertion of plaster waste molds in the forms faithfully reproduced the well-known words: Wolferman's—"Good Things to Eat." The results give one the substantial feeling of letters cut in granite. Thus, the signs were made to do the advertising and at the same time form the principal decorative detail.

Architectural concrete certainly helped solve the problems of this building. And there must be many other places where this material will do an excellent job.



*The building is located so the three main entrances lead directly from parking areas, rather than from the street.*

# Wolferman Building Construction

By J. C. Long*

THE new Wolferman Store, completed in 130 working days, is located on a 142x60-ft. plot at the corner of Main Street and Armour Boulevard in Kansas City, Missouri. It is a one-story structure, but, due to exigencies of the interior plan, ceiling heights vary as indicated in photographs of the exterior.

According to H. A. Noble, the engineer for the job, the most unusual structural feature of the building is the reinforced concrete eight-sided pyramidal roof over the main sales area which has a span of 40 ft. and supports a 7-ft. lantern, also eight-sided, at the center. Inverted L-shaped edge beams, which take the vertical load and horizontal thrusts from the rafters, were used to solve a difficult problem. In addition, these edge beams provided a concrete roof gutter invisible from the ground.

Entrances at three corners of the main sales room limited the space available for columns to support the roof. This resulted in the use of odd-shaped columns placed integrally with the walls and shaped to conform to the rounded corners of the room.

Three small cantilever concrete canopies are located at the front of the building over the customer entrances and a long cantilevered canopy 6 ft. wide shelters the loading platform in the rear.

The Wolferman Building is the first major structure in this territory in which 3,000-pound concrete was specified and used in the structural design. No difficulty was expe-

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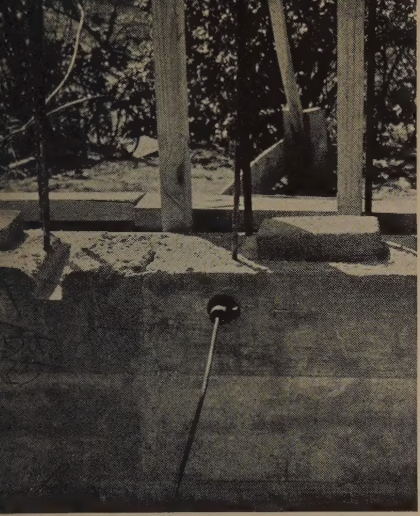
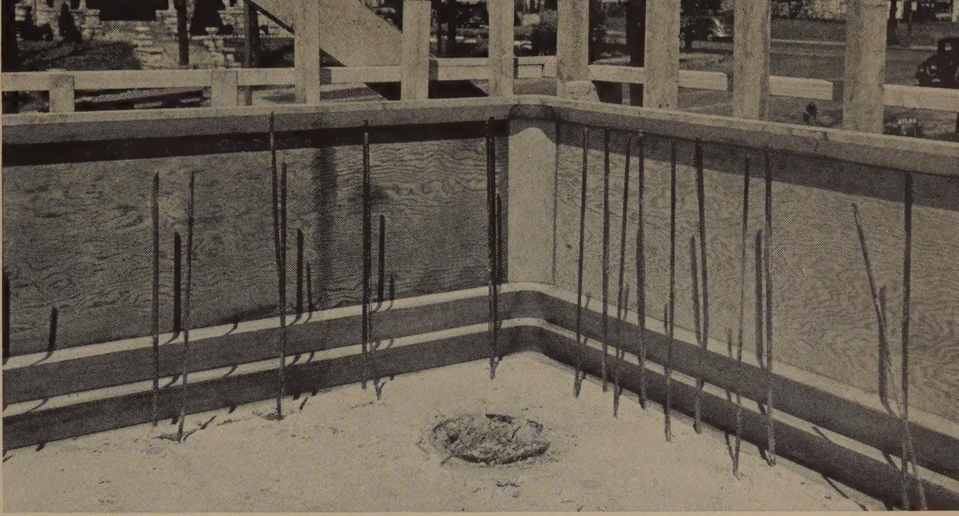
*President, Long Construction Co., Kansas City, Missouri.



*on joints were made using concrete block*
*groove for drainage when forms are cleaned.*



*Formwork on the Wolferman Building was carefully prepared. Specially milled wood forms were used for forming rustications at the coping and for the top of parapet walls.*

rienced in meeting the specifications; in fact, frequent tests showed 28-day strengths averaged 50 per cent greater.

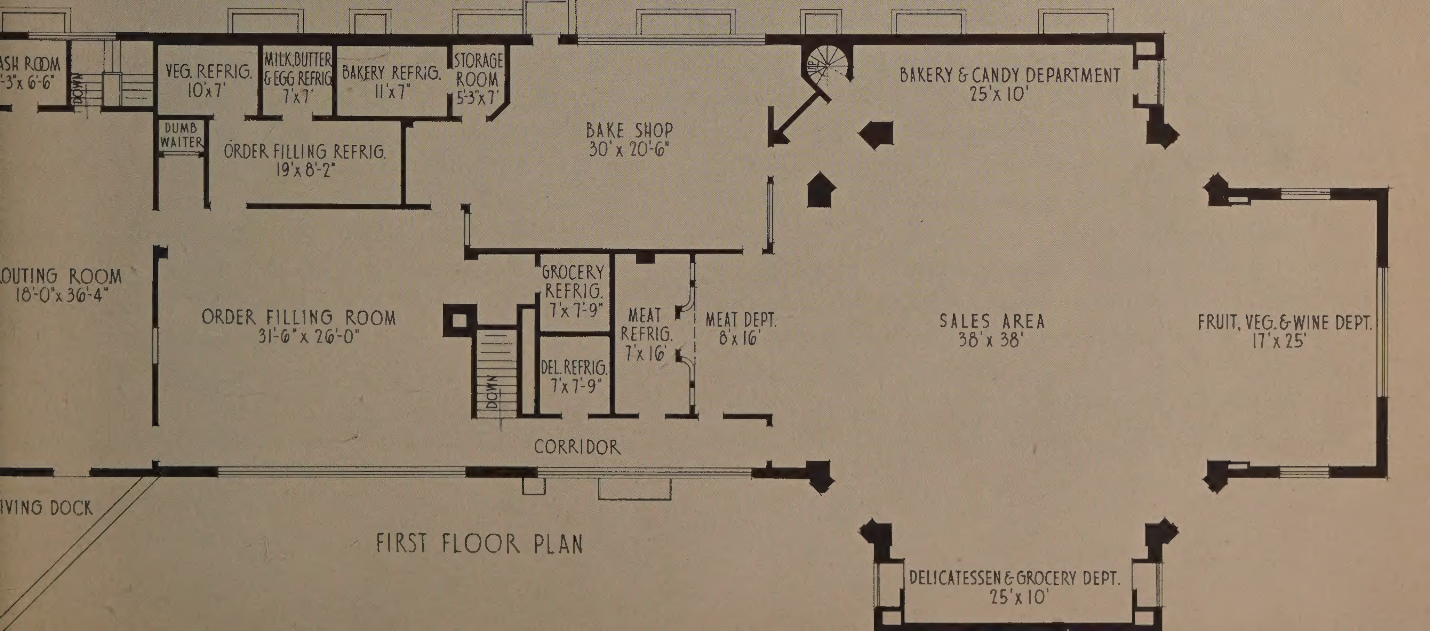
Walls are 10 in. thick, reinforced for a temperature range of 100 deg. F., utilizing two mats of small bars near the faces of the walls.

Concrete was furnished by the Ready Mix Concrete Company of Kansas City. This firm cooperated to the fullest extent in maintaining aggregate gradation and water control. The concrete came onto the job with a consistent slump of 4 to 5 in., and because of careful gradation in materials, it was highly workable. Both internal vibration and hand puddling were used for compaction, with outside forms pounded frequently with rubber mallets during placing to aid in elimination of air bubbles. Carefully-graded aggregates and proper placing of concrete in the forms account for the splendid appearance of the walls.

The incised lettering of the sign was produced by inserting plaster molds in the face form liner. Wood forms were used for all other ornamental work. The cost of the wood molds did not add materially to the cost of the forms, because they simplified the labor in making corners, window and door bucks.

There are two horizontal construction joints, making possible three uses of each set of forms. Construction joints were made with 4x4x12-in. precast concrete blocks, spaced 16 in. apart, used as keys. Drainage grooves, sloped to the back of the wall at the top of each lift of concrete at construction joint level, permitted the forms to be washed down and cleaned of debris before concrete was placed. The top of each joint was cleaned with steel brushes the day after placement.

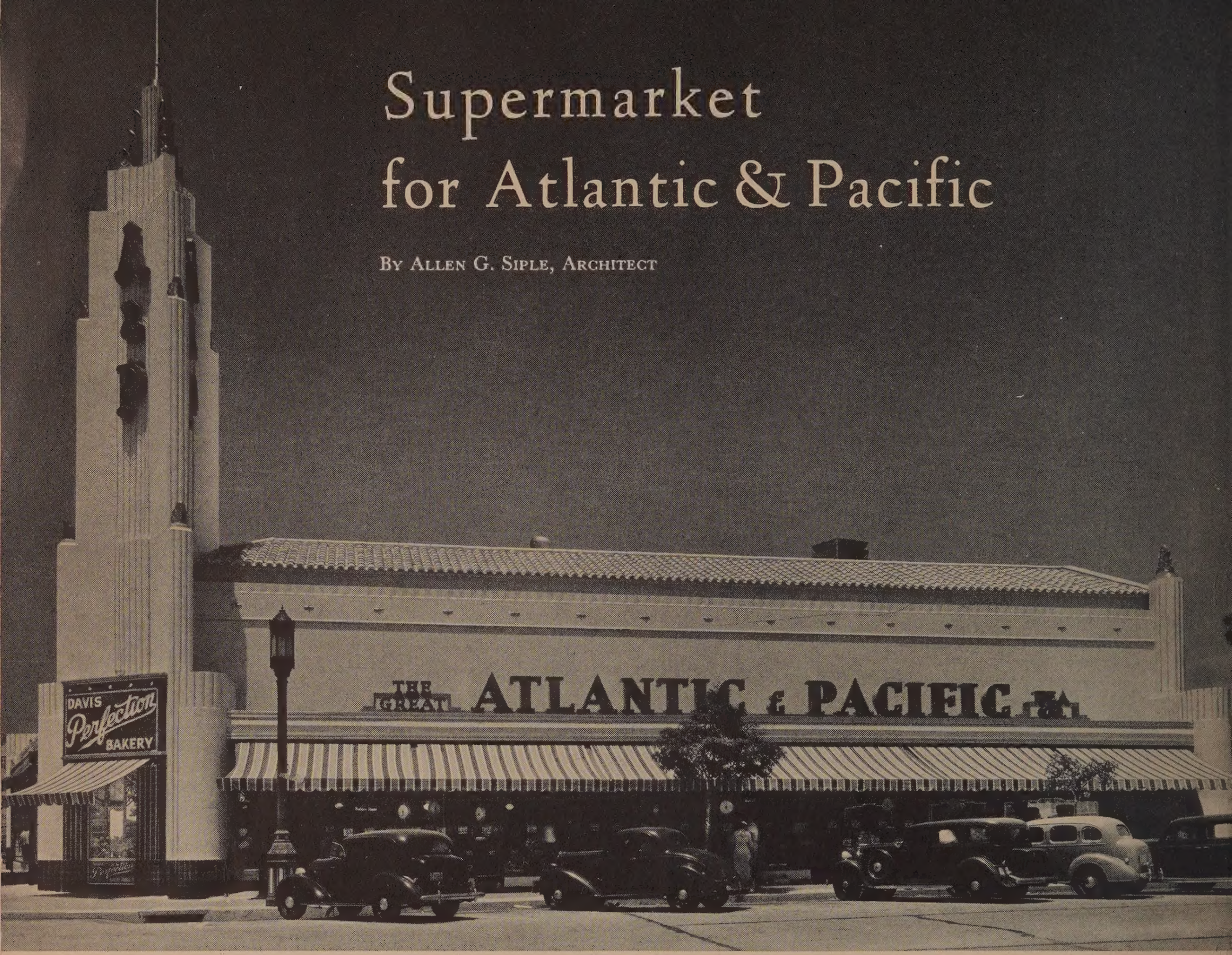
Removable pencil rods were used for form ties, the tie holes being plugged with grout using an ordinary grease gun. No patching was required and a very uniform texture was obtained. In fact, the concrete surfaces are so well formed and the natural texture and color of the building pleased the owner so much that he insisted that no paint or other surface treatment be used.



FIRST FLOOR PLAN

# Supermarket for Atlantic & Pacific

By Allen G. Siple, Architect



*Wide-open front areas required for this "supermarket" built for Atlantic & Pacific Tea Co., at Westwood, Calif., were provided by the use of deep set-back beams along both street facades. Allen G. Siple was the architect, S. B. Barnes, consulting engineer, and S. N. Benjamin, contractor.*

CURRENT requirements, and an eye to distant future need for adaptability to accommodate other tenants, form the background for the structural design of the new Atlantic & Pacific Tea Co. market building in Westwood, California. And it will be seen, by study of the structural design, that the most distinctive architectural motifs of the building are but extensions and refinements of the structural requirements.

Modern markets of the so-called "supermarket" type require the ultimate in clear, unobstructed display space. This is necessary for easy exposition of large quantities of various kinds of produce, for ready accessibility of customers to merchandise, and to be consistent with the modern theory that roomy, open areas have a favorable effect on shoppers. The single-span front is the only solution which satisfies these requirements.

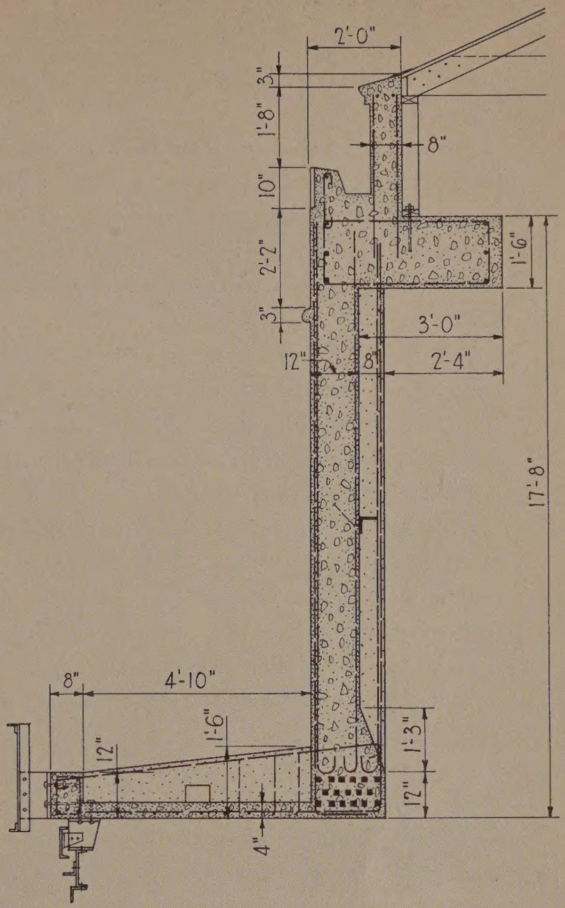
All business buildings which I am commissioned to design are built for the investor for lease to the tenant—in this case the Atlantic & Pacific Tea Co. The owner of the building naturally looks ahead to the expiration of the lease, at which time it may be advisable to remodel the structure for other tenants. It has been found that the clear-spanning structure is most readily adaptable to remodeling and subdivision into smaller frontage units of varying widths, without the arbitrary divisions imposed by closely-spaced interior columns, since chain store frontages vary between 12 ft. 6 in. and 27 ft.

These requirements of openness and ease of remodeling, combined with other conditions imposed by the angular shape of the property, dictated the fundamental design of the building. The building is located on a corner lot in an angle of about 108 deg., permitting the fronts on either side of the corner to be clear-span display spaces.

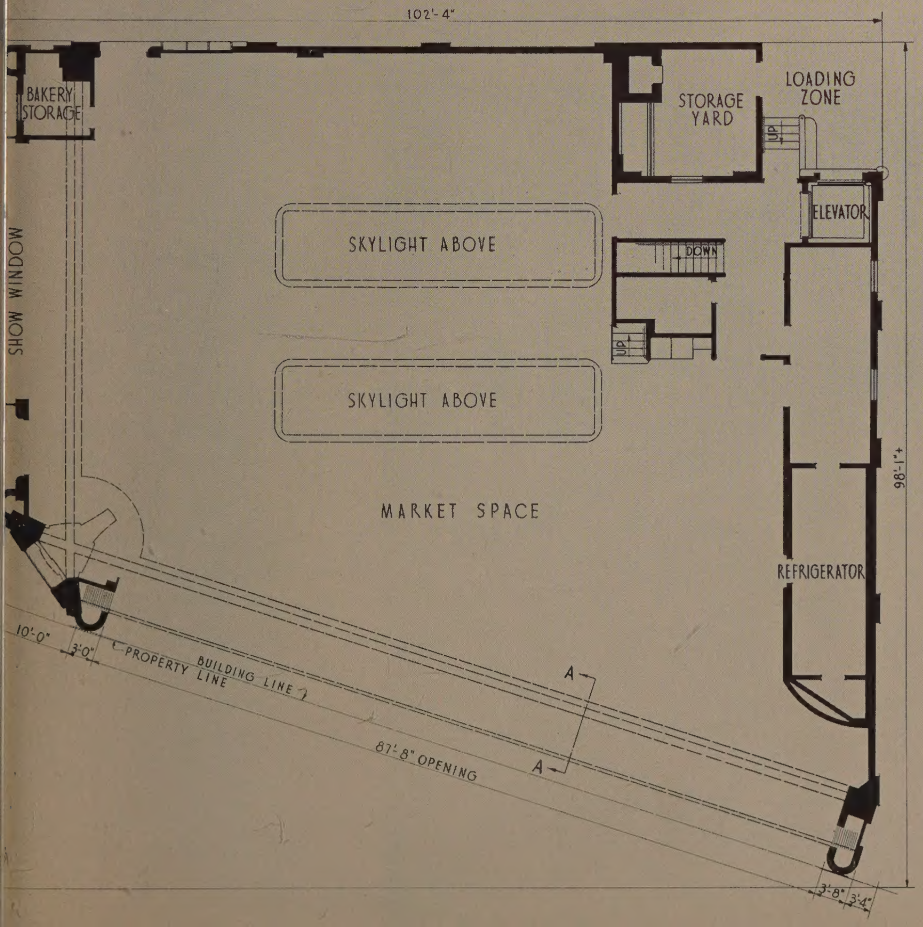
The spandrel beams over the large openings on the two street facades were set back to give clearance for future store front construction. To support the set-back beams, two columns were located back from the building corner, allowing a rather large display window to assume the space that might otherwise be taken up by a single large column sufficient to support both spandrel beams.

The deep concrete girders over the open fronts were therefore essentially the outer walls of the building. On one side a cantilever canopy was hung, producing torsional stresses in the spandrels of considerable magnitude. To stiffen the top flange of the beam, a horizontal fin was added. This resulted in a girder having the shape of a "Z." Stiffeners of concrete were added at strategic intervals.

Most unusual structural feature of the building is the manner in which the two spandrel beams intersect before reaching their respective column supports on either side of the corner. This necessitated computing relative deflections of the two beams at this point to determine the distribution of both vertical and horizontal loads. The beams and their supporting columns were analyzed as rigid frames, the foot-



*Section* A-A *through spandrel girder.*



*The intersecting spandrel girders created an interesting design problem.*

ings being prevented from spreading by tie beams at ground level.

It was the location of these columns and intersecting beams that suggested the triangular shape of the tower, the third leg of which is supported on a concrete slab spanning diagonally between the beams at their intersection. This diagonal slab also proved valuable in bracing the structure at that point

The two-column corner support was favored because the building was erected on filled ground. As designed, the two columns rest on a combined footing 24 ft. below grade, giving a soil loading approximately equal to the load on the other footings of the building.

In studying the structural design, a preliminary analysis using steel trusses was tried. But this proved uneconomical, due to the cantilever canopy construction and the difficulties involved where the two trusses intersected.

In style, the building is contemporary, in so far as it follows closely the structural design. Principal walls are smooth concrete, formed against rather large panels of plywood. The face of the canopy is molded so that resulting shadow lines will give definition to this feature. A projection at the bottom line of the coping produces another long, horizontal shadow line and a narrow band of shallow fluting terminates this portion of the design. Other detail is limited to vertical, molded fluting at the corners of the structure and in the curved sides of the tower. All concrete surfaces were given a finish of portland cement paint containing mica.

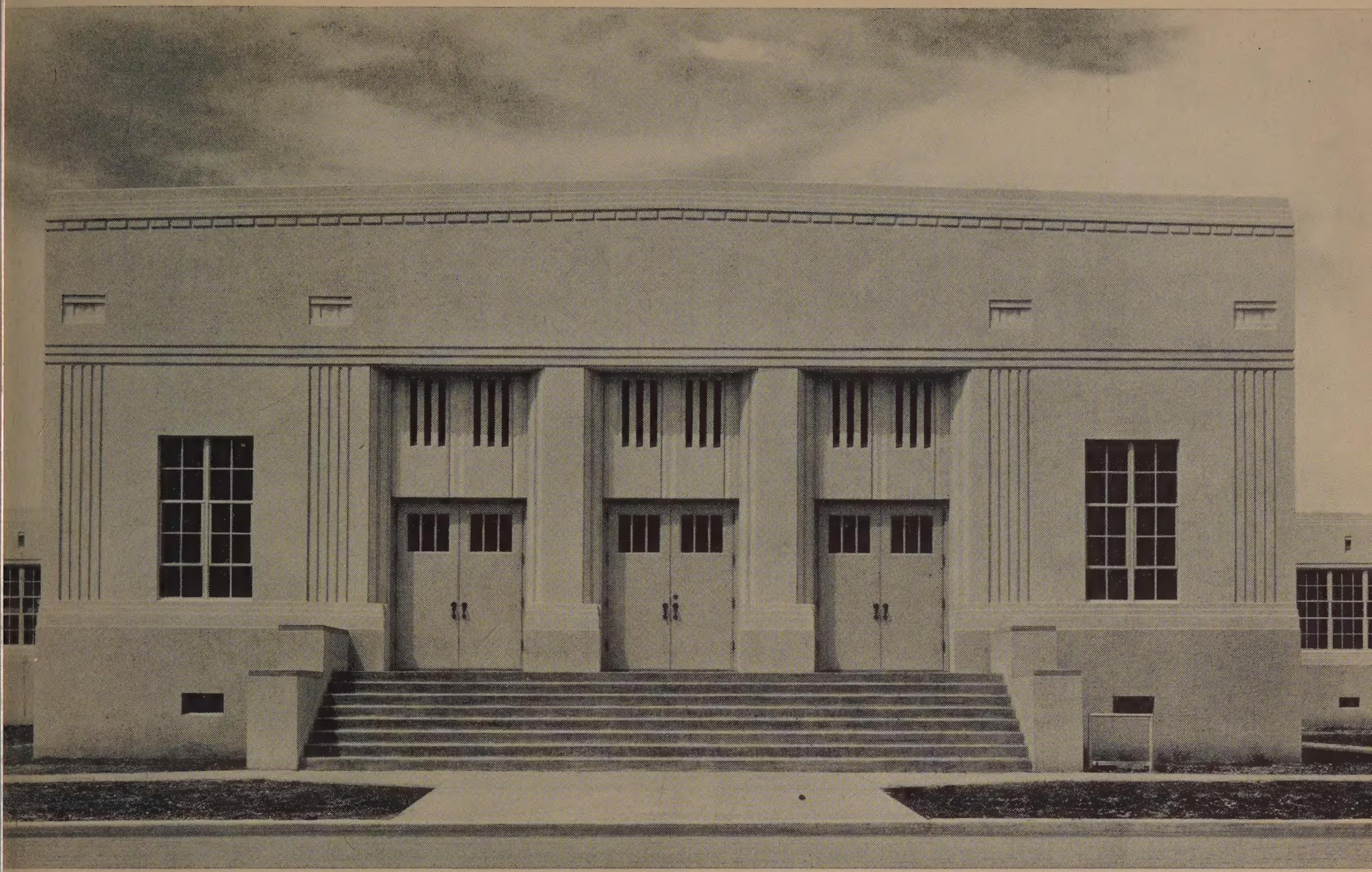
The triangular sign tower gives the best possible visibility from the three approaches to the building. It is not often that all requirements and conditions of a problem, which usually hamper the design, conspire in such a fortunate manner to help the designer as they did in this A&P store building.

Wise investors in this region invariably demand reinforced concrete buildings and insist that they be designed for future plan flexibility. Concrete rates first in durability of surface and for structural resistance to earthquakes. Concrete furthermore produces a psychological advantage where earthquakes are concerned, and this is of extreme importance to the success of a store. Customers still remember vividly the heaps of crumbling masonry after the last quake. They prefer a safe place for shopping, and reinforced concrete is recognized to offer that assurance.

Since all leases these days are on a percentage basis, the owner is virtually a partner with the lessee. The feeling of security which a concrete building imparts to the public is therefore reflected in cash register totals, which in turn reflect in more favorable rental. All of my concrete structures have turned out to be successful investments, returning greater rentals than were anticipated. The economy of this type of construction in original cost, continued operation and maintenance expense cannot be denied.

S. B. Barnes, consulting structural engineer, and George C. Schneider of my office deserve full credit for the solution of the difficult engineering problems involved in the design of the Westwood market.

*The wide clear-span area makes it possible to display large quantities of produce adjacent to the sidewalk. More space may be utilized inside the building and customers have better access to displayed wares.*



*Second concrete school finished in San Antonio, Texas, within a year, is Southwest Junior High School, a PWA project. Phelps and Dewees and Simmons, architects; Leo M. J. Dielmann, consulting architect; Ed W. Oeffinger, contractor—all of San Antonio.*

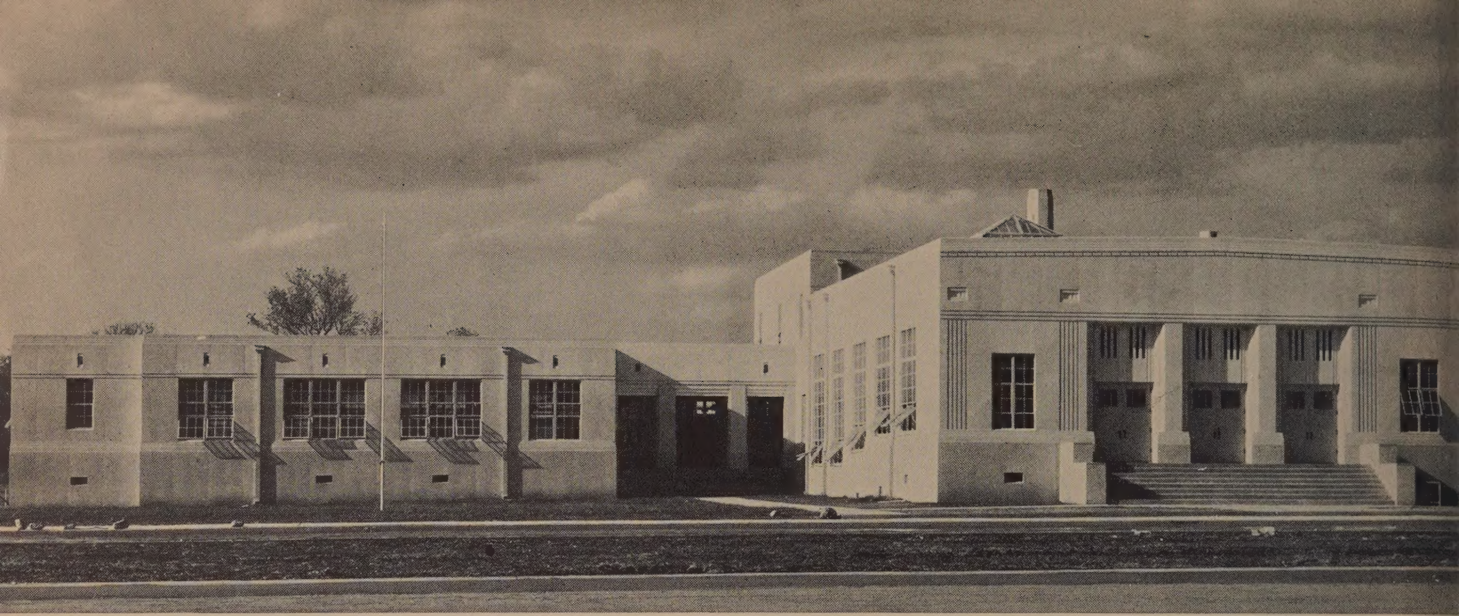
# Number 2 for San Antonio

By C. C. Simmons

FOR the second time this year the San Antonio, Texas, Board of Education has officially accepted and opened for use a new junior high school. The second school, like the first, put into use last February (see Architectural Concrete, Vol. 3, No. 2) is a large, modern structure of architectural concrete construction. Phelps and Dewees and Simmons were the architects, and Leo M. J. Dielmann was consulting architect.

Known for the present as Southwest Junior High, the new building is located on part of a 60-acre tract that was never developed for urban dwellings. It had been used, previous to this time, as an irrigated garden and has on it a flowing artesian well. With so much land available in a desirable open location, it was decided to erect the entire structure on one floor—a type of construction favored by the State Department of Education. Planning the school on a single floor level and arranging the related units such as classrooms, physical education department, auditorium and cafeteria into an efficient educational plant was the most interesting part of the entire project. As designed, the school fits well into San Antonio's modified system of vocational education.

One of the principal requirements in planning the structure was economy in construction. The Board was interested primarily in securing the greatest amount of usable floor space without sacrificing fundamental educational requirements or pleasing, dignified appearance. Limited funds prohibited the use of any amount of decorative features and necessitated a simple treatment of the exterior. Based on previous experience (we were consulting archi-



*A single-story structure, except for one second-floor room, this large school spreads over a wide area. The architects have relied on simple decorative motifs and well-proportioned masses to give an effective appearance to a difficult design problem. Wall finish is a buff dash coat of stucco.*

tects on the Horace Mann school project) our firm decided that architectural concrete would produce the desired advantages and economies for Southwest Junior High.

The architecture of the new building is a simple use of modern lines, a style selected both for its acceptable appearance and simple construction. Economies were made in the interior as well as the exterior, with parts of the building such as manual training shops and physical education units having painted concrete walls instead of plaster finish. While omission of plaster realized a decided reduction in finishing cost, the painted walls are most pleasing in appearance.

Architectural concrete has proven adaptable to any style of architecture and it is particularly appropriate for modern forms. Since economy was of prime importance, a simple yet effective decorative treatment was sought. The problem was solved by the use of recessed or set-back ornament, very easy to execute and most characteristic of concrete work. With the building spread out over a large area and divided into many units, there was a splendid opportunity for repetition of detail and repeated use of wood forms with but slight alteration.

The effective appearance of Southwest Junior High lies principally in its mass. There is practically no special ornamental treatment, except at the front elevation of the auditorium where fluting and other easily molded decoration is employed to good effect.

In plan the building is a modified H-form with an over-all dimension of 308x456 ft. With only a music room located at second-story level, the entire ground floor is 3½ ft. above grade. Clearance in the classroom areas is 11½ ft., and the average height of the parapet wall above the ceiling line is 5 ft. With a volume of 750,000 cu. ft., the total cost of the building, exclusive of architects' fees, furniture and equipment, was $190,880—a cubic foot cost of about 26 cents.

Foundation conditions in the San Antonio area are unusual and it is customary practice to use bored pile foundations for structures of any size or consequence. Accordingly, 18 and 24-in. diameter bored piles up to 30-ft. lengths were employed in the foundation throughout the structure. The 6-in. walls above window-sills required additional stability, which was effected by means of a lateral beam, the stem of which projects on the inside of the parapet wall. In other words, the pilasters give vertical stability to the walls and the lateral beams provide horizontal stiffness.

All exterior walls, except stage walls, are of reinforced concrete. Roof construction and classroom floors are wood, with auditorium and corridor floors of reinforced concrete. A plain concrete top was used for the auditorium floor, and terrazzo in the corridors. The partitions are metal lath and plaster.

A thoroughly workable mixture of concrete was designed, using well-graded aggregates, and controlled by batching all sand and gravel by weight on a portable platform scale. Placed by buggies from level runways, all concrete was vibrated with a portable gas-powered vibrator. To aid vibration, the outside forms were rapped with mallets. This eliminated all water and air pockets and produced a smooth-finished surface. The sharp lines of the detail may be credited to the well-filled forms.

Horizontal construction joints occur at window-sill and window-head lines. The lift of concrete from grade to sill was approximately 8 ft., with another 8-ft. lift to window-

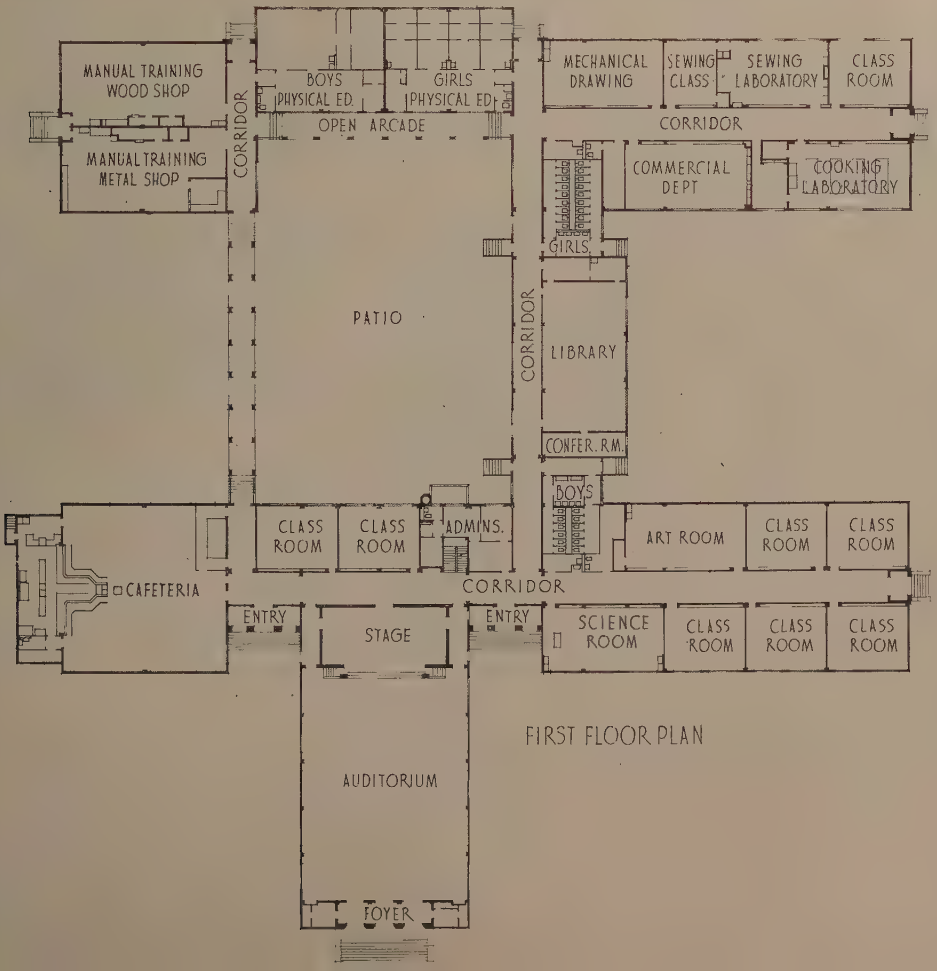
head and 5½ ft. to the top of the parapet. Forms for exterior exposed concrete were built in 4x8-ft. panels lined with ¼-in. plywood over 1x6 square-edged sheathing.

No plaster mold work was used, the circular ornament, fluting, set-backs and rustications being developed through the use of wood molds. The same wood molds were used repeatedly. The panel forms were used three times in each story height and expansion joints were so arranged that the building could be erected in five units. This permitted each panel form to be used from 12 to 15 times. Everything that would contribute to easy handling of forms was planned out in advance of construction.

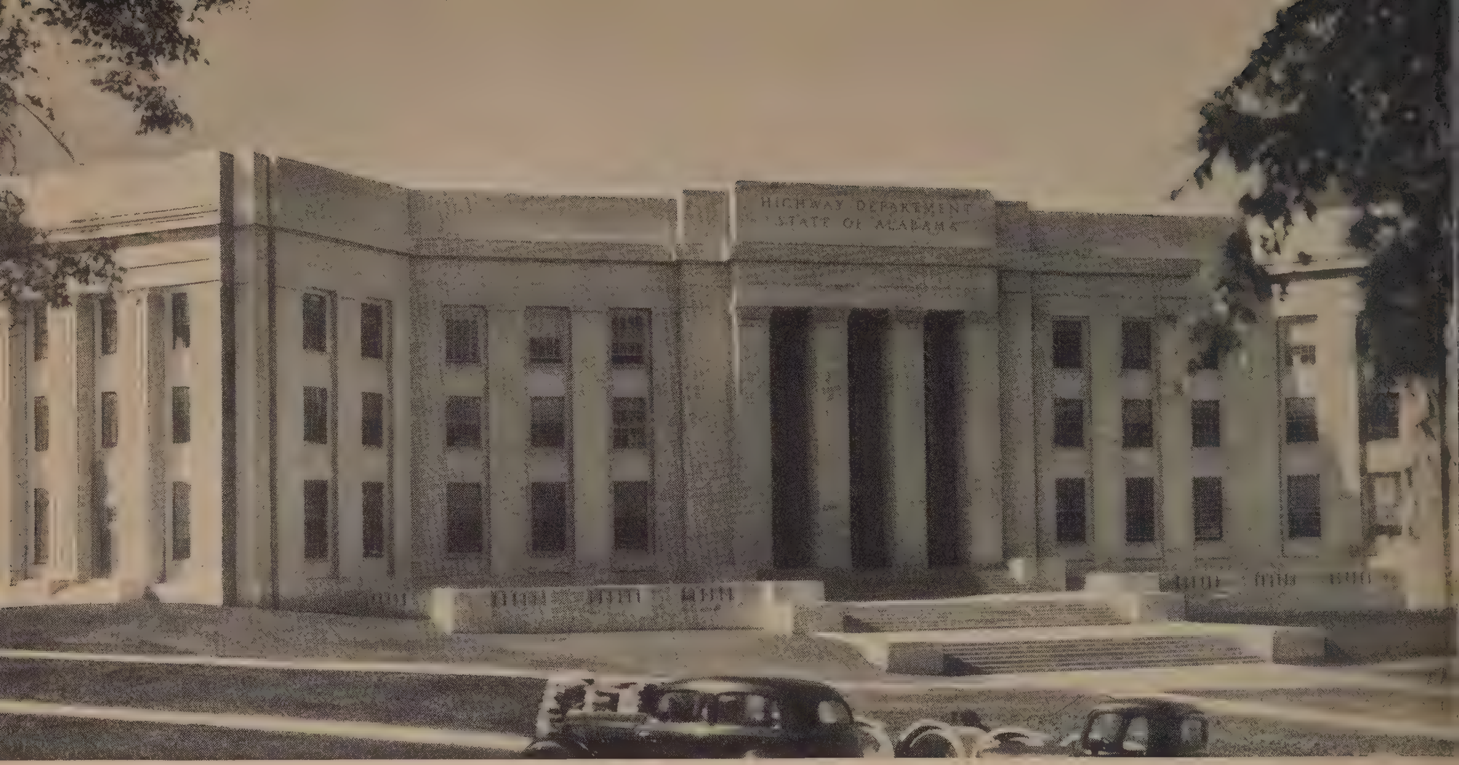
Reinforcement followed more or less conventional practice, with care taken to strengthen corners of all openings.

The smooth texture developed by rigid, well aligned forms, vibration and tapping, required practically no patching. After curing, the exterior was given a coat of buff-colored portland cement paint, followed immediately by application of a buff dash coat of stucco. The paint formed a bond coat and also made it possible for the thin application of stucco to cover the walls. Although the dash coat is thick enough to give the surfaces a uniform color, it is not so thick that the characteristic joint lines and details created by mass concrete are effaced. The color of the finish is slightly darker below the sill to minimize stain and splashing from the earth.

The circular ornament was given two coats of portland cement paint and no dash coat. This makes the ornament more vivid in contrast to the plain wall surfaces.



FIRST FLOOR PLAN



*State Highway Department office building recently completed at Montgomery, Ala., harmonizes with the nearby Capitol. Designed by Richard J. Adams, architect for the Department, and Warren, Knight and Davis of Birmingham, consulting architects. Construction was by WPA forces.*

# Alabama Highway Department Building

By H. H. Houk*

ALABAMA'S state government offices at Montgomery were for many years confined to the area occupied by the present Capitol, built in 1851 and enlarged by adding wings at different times until it reached its present proportions in 1912. It once served as the seat of government of the Confederacy, and is regarded as an outstanding example of classic design in capitol architecture. Gradually, during the later years of the state's growth, adjacent residential property was acquired and existing structures were adapted for use as office buildings. These facilities were only temporary, awaiting a comprehensive capital plan.

At the instance of Governor Graves in 1928, the Capitol Building Commission employed Olmstead Brothers of Boston to submit plans for the future development, improvement and beautification of the State Capitol and several institutions located over the state. The Olmstead Plan, as approved, provided for acquisition of additional areas adjacent to the Capitol and established the location and arrangement of appropriate buildings that will in the future be required to house principal state government agencies.

In 1935 the Highway Department, housed first in one and later in a series of revamped frame residences, submitted an application to State Administrator Holt for construction of a new Highway office building as a WPA project. This application was approved and work started in November, 1935.

The primary objective in the structural and architectural design of the building was to select materials and details that would provide as many man-hours of job labor as practicable, at the same time produce a permanent public building of architectural merit adaptable to such uses as future conditions might require.

Since fine sand, locomotive cinders, commercial sand and gravel are produced locally and cement and reinforcing steel within 100 miles, the natural choice was an architectural concrete structure with cinder masonry partitions.

The fact that concrete is an economical architectural medium well adapted to the classic type of monumental building was an added reason for its selection. This type of construction utilizes a minimum of expensive materials and employs a maximum of common labor on the job.

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*Chief Engineer, Alabama Highway Department.

When well designed and executed, it produces permanent buildings of the finest type.

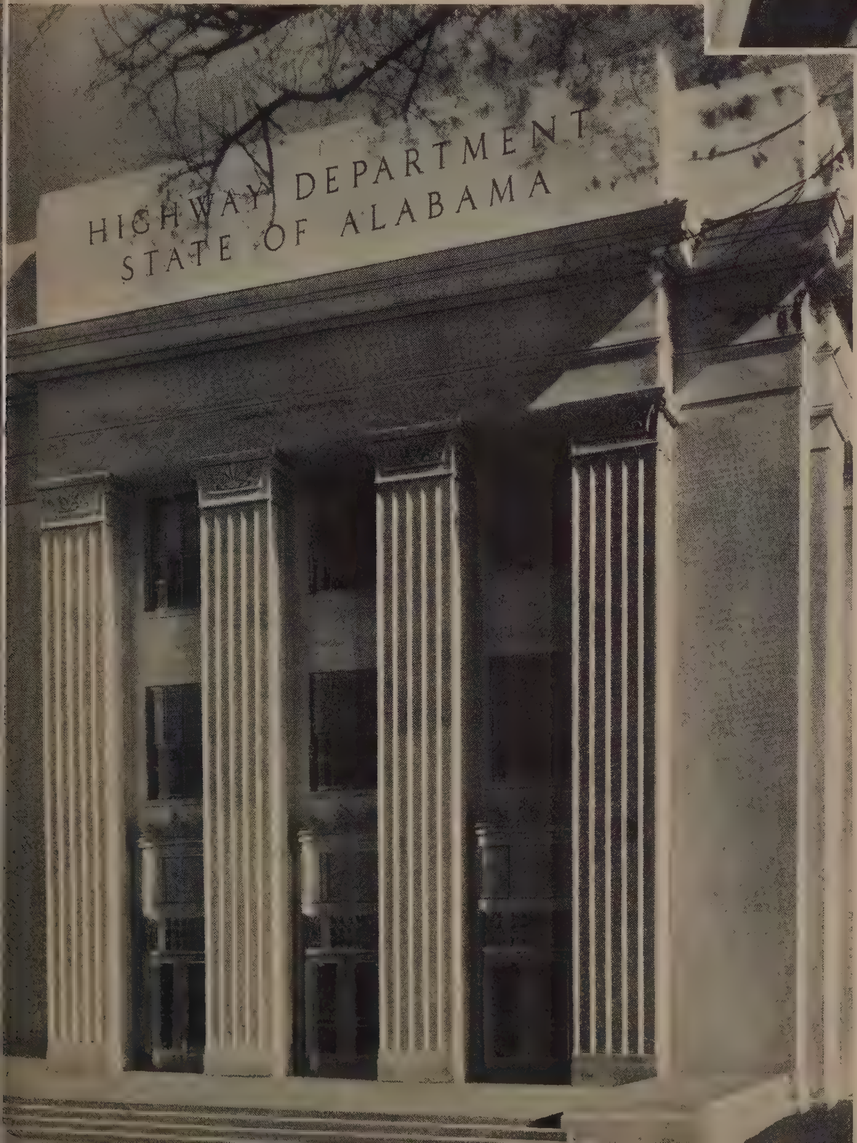
While serving as constructing and structural engineer for the Insular Government in the Philippines, where good building stone is rare and always expensive, the writer designed and built many public structures in architectural concrete, employing local labor and available materials.

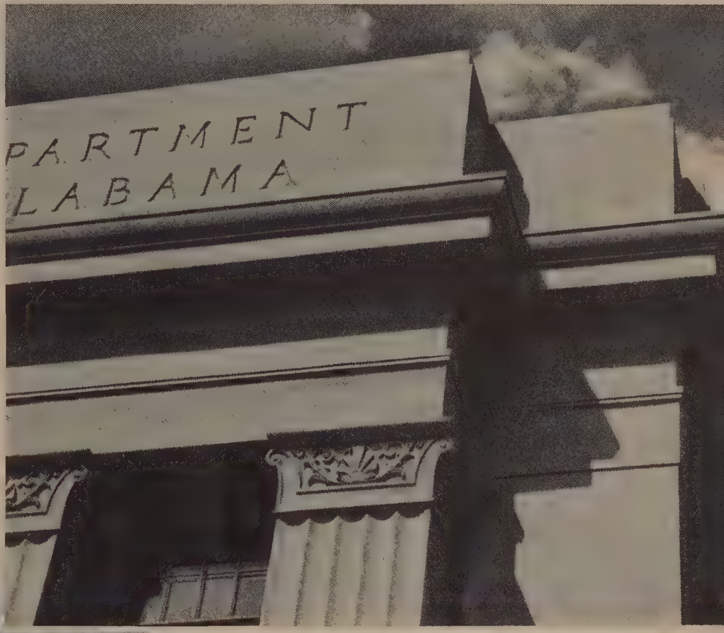
The layout of the Highway building was chosen and floor plans arranged to conform to present and anticipated needs of the department. Richard J. Adams, architect of the Highway Department, did much of the preliminary planning. In order to attain the best possible architectural proportions and treatment, the firm of Warren, Knight and Davis, of Birmingham, was employed to harmonize the design and details with the classic design of the Capitol building itself and with the plan developed by the Olmstead Brothers.

The result was a building of dignified design, with simple details, well-proportioned masses and good outlines. When due regard is given to the characteristics of the materials, such a simplified design can be frankly and effectively expressed in concrete without imitating stone or any other material. Much thought was given to detail, both in preliminary planning and throughout construction.

Since success in use of architectural concrete depends largely on the design, construction and arrangement of the forming, forms were designed to give sharp, well-defined lines, and construction joints were located so they would not be visible on the exposed surfaces of the walls. Tempered Presdwood and plywood were used in forming all exposed surfaces, including the bottoms of those sections of the floor slabs which serve as ceilings.

*dignified design of the entire building is evident in this rear entrance detail.*





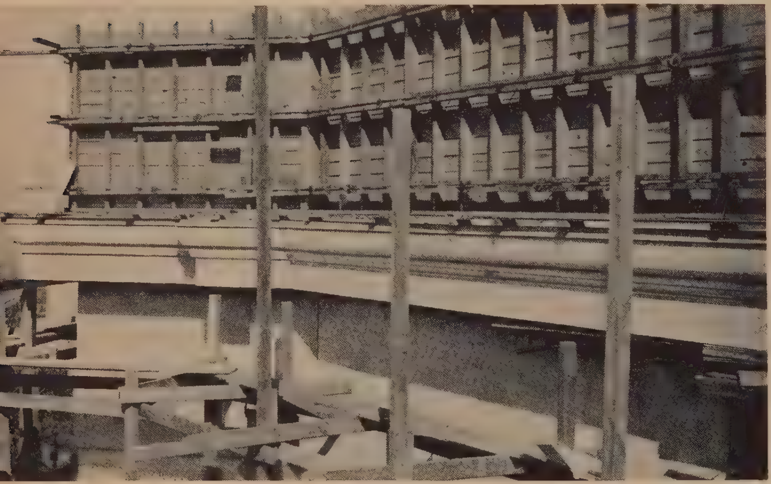
*Silhouetted against the cloud-dotted Alabama sky, the importance of carefully-constructed forms is apparent in sharp arrises and smoothly molded cornice.*

Sheets of forming material were ordered and cut so that location of all joints between different sheets were definitely fixed and symmetrically arranged around the exterior of the building. To eliminate horizontal construction joints in the exterior walls between the first-floor level and the column caps, small construction columns located in the pilaster areas were used to support beams and girders of the second and third floors until the pilasters and walls were finally placed. This expedited progress of construction and gave ample time for shrinkage of the concrete floors, also provided rigid supports for bracing the outside wall and column forms to line during concreting. Other horizontal joints were located in the cornice and entablature where they would be concealed from view by moldings and breaks in the surface. Vertical joints were placed next to pilasters and were concealed behind the edges of the pilasters. Plaster waste molds as shown below were used in forming column caps and medallions in the ceiling of the portico over the front entrance. These were cast in place with the walls.

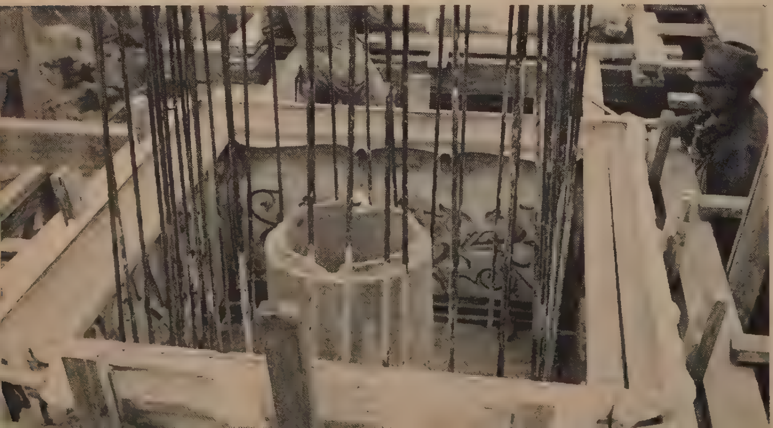
Window-sills were not placed until after wall forms were removed. The outside portion was then placed when it could be accurately formed, correctly aligned and neatly finished. The interior portion of the window-sills was placed after the windows and interior cinder block wall furring were in place, and are of black concrete made with a liquid pigment. Lintels of cinder concrete, precast on the job of the same mix used in the masonry, were used on the interior over all the windows to harmonize with the masonry.

*Interior partitions are cinder concrete masonry.*

*Forms were carefully constructed.*



*Column caps were formed with waste molds.*



Cinder masonry was manufactured on the site with an inexpensive block machine by relief labor. Crushed locomotive cinders were donated by railways in the city. The machine, although designed to produce but four sizes of masonry, was made to turn out several other sizes, by means of ingenious separating devices. Thus all sizes were available for the random ashlar pattern used.

Form lumber of ordinary dimensions was used throughout, with the exception of lining material used in forming cornice moldings, column caps and flutes. All lumber was used many times and much of it, as well as the lining material, was finally salvaged in fair condition for use on other WPA and state highway projects.

All concrete mixes were designed by the State Highway Laboratory for good workability and the specified strengths. Concrete was placed directly in the forms from 2-wheeled pneumatic-tired concrete buggies. A portable 10-S tilting mixer discharged directly into the buggies, which were wheeled to points of dumping or raised on a platform hoist for lateral distribution.

The concrete was tamped, puddled and vibrated in and around reinforcement and along the sides and bottoms of the forms. Every effort was made to secure a dense, uniform concrete in place rather than test specimens of high compressive strength.

Sub-basement and basement floors resting on the ground were reinforced with welded wire mesh and were placed on a sand cushion covered with one layer of tar paper. The portions of exterior walls below ground level were painted with three coats of tar waterproofing. As a result the basement and sub-basement are remarkably dry and entirely free from dampness.

Concrete in columns was placed the full height between the reinforced concrete floors, which were placed in three sections. The roof was placed in one continuous operation to avoid construction joints and possibility of leakage. The roof slab has no other covering than a water sheet which serves as insulation and protection against effects of extreme temperature changes. The depth of the water sheet can be regulated at will or removed entirely for roof dancing and other purposes when occasion demands.

All service pipes and drains were placed below basement and sub-basement floor slabs and in other floor slabs, columns, walls and partitions. Galvanized conduit was used for wiring, cast iron and copper for other service pipes.

To resist temperature and shrinkage stresses, the walls were reinforced with two curtains of small bars closely spaced and carefully lapped to preserve the continuity of reinforcement at corners and intersections.

Immediately after stripping the forms, bolt holes and pin holes were filled with a cement-sand mortar and the exterior given a light coating of cement and sand grout. No other treatment was given except thorough curing, until the building was completed. Then the entire surface was rubbed down by hand with carborundum bricks, starting at the top.

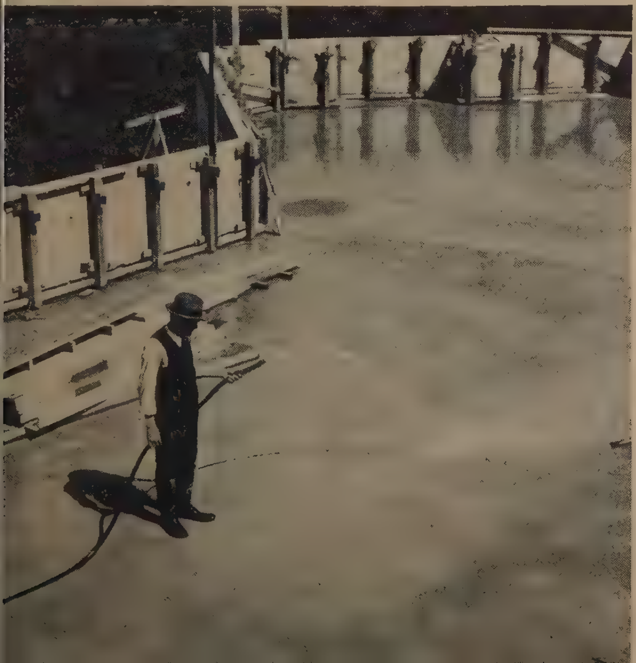
The entire top of the floor slab of each floor was finished smooth so the location of the partitions can be easily changed or removed to conform to future requirements.

The underside of the floor slabs serve as ceilings for all rooms, lobbies and corridors except the main floor lobby and in those parts of the corridors where a drop ceiling was necessary to provide a covering for large heating and air conditioning ducts.

Exposed concrete and terrazzo in the corridors was brought to a high finish. Asphalt tile and rubber flooring laid on mastic directly on the concrete was used in offices and drafting rooms.

The cinder masonry partitions, 4 and 8 in. in thickness, were rigidly bonded into steel door frames. Walls of basement offices and stair wells were painted to improve light conditions, but all other cinder masonry walls were left unpainted. All ceilings were given a coat of cement paint, applied by means of a spray.

*The roof slab was cured by ponding.*



*Ordered simplicity characterizes the entire design.*

An integral unit without contraction joints, the Alabama Highway Department building is architecturally attractive in its ordered simplicity. Except for the plaster ceiling in the main lobby and corridors and the honed Alabama limestone in the main lobby, all exposed surfaces outside and in are either architectural concrete or cinder concrete masonry.

W. D. Crawford was project engineer and the entire design and construction was carried out under the direction of the writer and C. J. Sherlock, first assistant engineer. Thad Holt was State Administrator for WPA and W. G. Henderson, District Director of WPA. Emil S. Hugger, formerly of Hugger Brothers Construction Co., and J. E. Mills, one of their superintendents, supervised the construction. William Grant, Birmingham sculptor, executed all waste molds.

# Architectural CONCRETE

ARCHITECT · ENGINEER · CONTRACTOR

## IN THIS ISSUE

EDWARD TANNER and J. C. LONG tell (page 3) about a GOOD PLACE to get GOOD THINGS to eat . . . The way ALLEN SIPLE figured it (page 6) the GREEN GOODS are right on the sidewalk . . . It was quite obvious, says (page 9) C. C. SIMMONS, why San Antonio bought another CONCRETE SCHOOL . . . Tired of moving, according to H. H. HOUK, ALABAMA HIGHWAY DEPARTMENT settles down (page 12) in a rather classic setting . . . PERMANENT READING MATTER is discussed and diagrammed (pages 17 to 20) in a data sheet for your A.I.A. files. . . . FIFTEEN HOURS from New York is America's newest airport building says (page 21) GEORGE D. BURR . . . Five abstracts (page 25) that are rapidly becoming CONCRETE . . . In HARNESSING THE LOUP, the architecture (page 26) was incidental, says F. E. PEACOCK, but came out on top and elsewhere . . . Stand by for STANLEY DAVIDSON in a broadcast (page 28) about transmitting stations, WEAN in particular . . . The BANK CAME THROUGH and Martin County got its court house, described here (page 30) by L. PHILLIPS CLARKE . . . WEST INCINERATOR, says EDWARD RAMSEY (page 32) is ready for the rubbish . . . Yeggs at Alcatraz can study a fine piece of MEMORIAL ARCHITECTURE (page 34), and maybe wish they were there.

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## The Forgotten Building

MOST neglected of all American buildings from the standpoint of pleasing architecture have been small buildings—garages, stores, apartments and small commercial structures. Until quite recently, the small structure that reflects the architect's touch or the craftsman's care has been the rare one among the many thousands of unpretentious buildings which together form most of the urban scene.

This neglect has been due, probably, to the feeling that an unimportant building does not deserve more than the appearance of an adequate shelter, that the least possible expense should be incurred in the erection of a building that is intended to function rather than be admired. The error of this indifference is most apparent in cities where large, impressive, monumental structures are surrounded by dull, nondescript, even ugly little buildings that mar the effect of the best architectural efforts.

Recognition that the small building not only deserves better treatment, but that the owner of any building is responsible to the community for his part in its improved appearance, has already started a trend toward better architecture for small buildings. Large owners of gasoline and service stations have finally discovered that these outlet points can be made into potent advertising mediums. This has resulted in widespread remodeling and reconstruction, bringing splendid improvements to important locations. An increase in civic conscience, outgrowth of emergency programs for modernization, should make any prospective builder hesitate today before erecting a carelessly conceived new building.

Closer attention to the small building as a possible architectural subject has resulted in an important discovery—that it costs little or no more to build a good-looking structure than one which completely lacks charm. Particularly is this true of reinforced concrete construction in which the forms which mold the structure can, at the same time, produce textures and details worthy of the most respected architects.

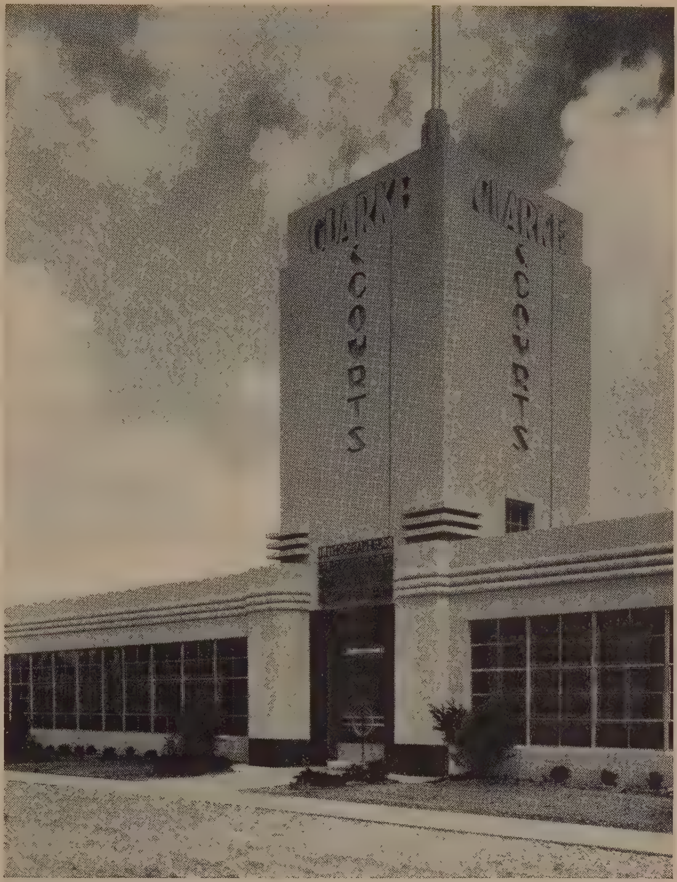
# CONCRETE LETTERS

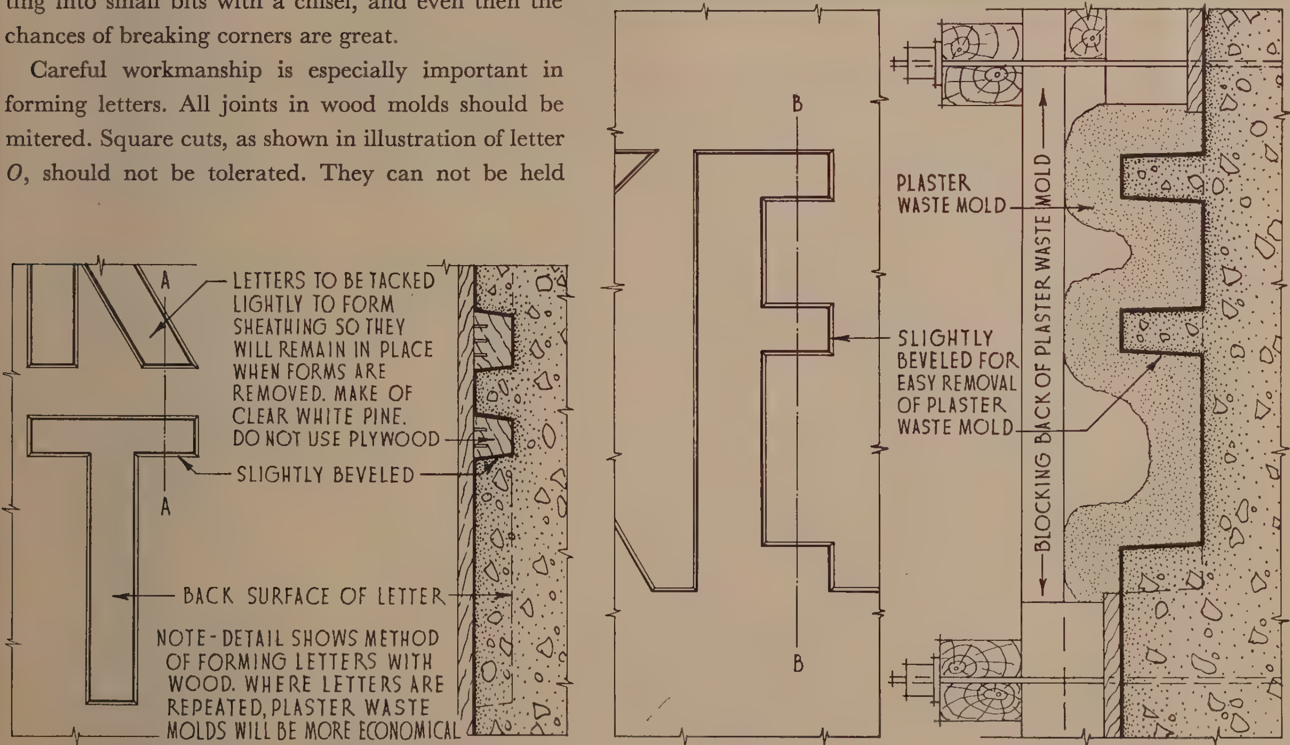
LETTERING on buildings serves the dual purpose of conveying information and acting as decorative detail. Where the lettering forms the name of the building or its owner, it becomes a permanent advertisement which must be a good one or it were better omitted altogether.

The construction of lettering in concrete is no different than that of any other incised or raised ornament formed with wood or plaster waste molds. All the suggestions given in this section in previous issues regarding kerfing the back of wood molds to prevent binding, providing a draw so the mold can be stripped more easily without breaking corners, making the contact surface of waste molds with colored plaster so the workman will know he is approaching the concrete when cutting away the plaster and similar construction kinks, should be remembered and used.

Only select white pine or other close, soft-grain lumber should be used for wood molds for letters. Open, hard-grain lumber, such as shown in illustrations of letters *O* and *R*, should not be used as it will swell and warp more than soft-grain wood. Plywood must never be used to form incised letters, as it will swell and bind and can not be removed except by cutting into small bits with a chisel, and even then the chances of breaking corners are great.

Careful workmanship is especially important in forming letters. All joints in wood molds should be mitered. Square cuts, as shown in illustration of letter *O*, should not be tolerated. They can not be held

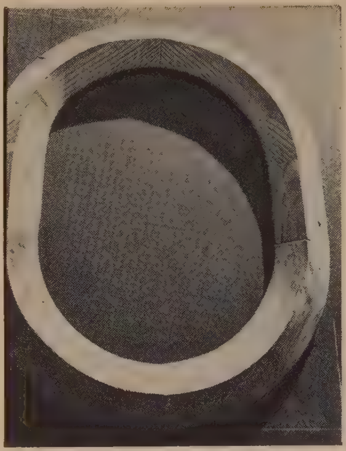



A
A
LETTERS TO BE TACKED LIGHTLY TO FORM SHEATHING SO THEY WILL REMAIN IN PLACE WHEN FORMS ARE REMOVED. MAKE OF CLEAR WHITE PINE. DO NOT USE PLYWOOD
SLIGHTLY BEVELED
BACK SURFACE OF LETTER
NOTE - DETAIL SHOWS METHOD OF FORMING LETTERS WITH WOOD. WHERE LETTERS ARE REPEATED, PLASTER WASTE MOLDS WILL BE MORE ECONOMICAL
B
B
PLASTER WASTE MOLD
SLIGHTLY BEVELED FOR EASY REMOVAL OF PLASTER WASTE MOLD
BLOCKING BACK OF PLASTER WASTE MOLD

·ELEVATION· ·SECTION ON LINE A-A·
·INCISED LETTERS·

·ELEVATION ·SECTION ON LINE B-B·
RAISED LETTERS·

·DETAILS OF TWO TYPES OF LETTERS ON CLARKE AND COURTS BUILDING·



tight, which will result in fins at every joint and a rough, ragged letter. The adjoining parts of a mitered joint can be nailed and glued securely together, each part bracing the other. The mitered joints in letter *R* are well made.

Only carefully milled material should be used for wood molds; after the letter mold is assembled, joints should be sanded to remove any trace of roughness. Because it is important to prevent any swelling, the entire mold should be given a couple coats of shellac and finally oiled before concrete is placed.

Although incised letters can be formed with wood molds, if carefully done and the precautions just described are followed, it is generally advisable to use plaster waste molds because they do not swell and warp. It will almost always be economical to use waste molds instead of wood, especially so if there is any repetition.

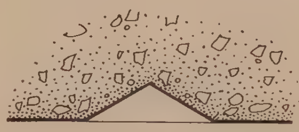
Thought should be given to the selection of the letter profile or cross section. Letters may appear ragged or distorted because of the shadows cast on the letter itself or on the wall surface. This can be avoided by observing the principles of shades and shadows and selecting a profile that will give sharp, smooth, regular shadows. Several profiles for both incised and raised letters are shown and their merits analyzed.

The visibility of letters is to some extent determined by the background and the style of the letters. There should be a contrast between the surface of the letter and the background. Without the aid of shadows, the letter with a plain face surface stands out best against a textured surface, while a letter with a lined face will be more visible against a plain surface of the same color.

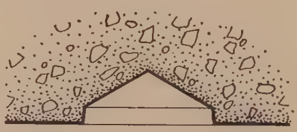
By painting the back of incised letters and the face of raised letters in a color contrasting with the surface of the wall, they will be much more prominent than when left in the natural color, especially when the sun is not shining.

Regardless of the building material, moisture streaking around letters either incised or raised is a source of some annoyance. It is inevitable that dirt will be collected and subsequently be washed down the face of the wall. If uncontrolled, the apparent shape of letters will be altered by moisture streaks. The effect of such streaking should be considered when designing the profile of letters. By providing a drip on all lower edges of raised letters, as shown in one of the accompanying illustrations, moisture will drip free and pronounced streaking will be minimized.

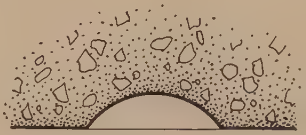
The solution of all problems of distortion due to irregular or poorly pronounced shadows and to moisture streaking as well as obtaining the maximum visibility, lies in the use of a precast letter of contrasting color set flush with the surface of the wall. As illustrated, such letters can be set in the form and concreted in place so they become an integral part of the wall.



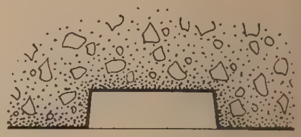
THE FLATNESS OF THE ORDINARY V-INCISED LETTER MAKES IT HARD TO READ. LIGHT STRIKING THE ANGLE CAUSES IT TO FADE AND THE SLIGHT SHADOW CAST DOES NOT PRODUCE ENOUGH CONTRAST IN SURFACE SHADE TO MAKE ADJOINING SURFACES APPARENT



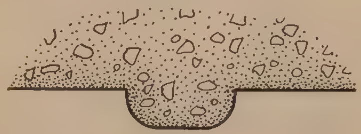
SQUARE SHOULDERS OF THE V-INCISED LETTER MAKES A SHARP SHADOW BUT THE BROKEN SURFACE OF THE BACK CAUSES AN UNEVEN SHADOW MAKING THE LETTER APPEAR IRREGULAR



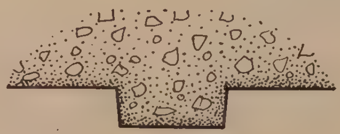
CURVED INCISED LETTERS ARE A LITTLE BETTER THAN THE ORDINARY V-INCISED LETTERS BECAUSE A STRONGER SHADOW IS CAST BY THE OUTER ANGLE, BUT THE SHADOW LINE IS CURVED GIVING A DISTORTED APPEARANCE



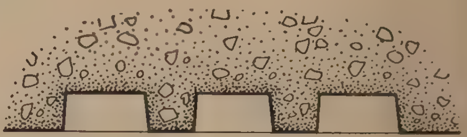
INCISED LETTERS WITH RIGHT ANGLE SHOULDERS AND FLAT BACK STAND OUT CLEARLY BECAUSE THE SHADOW CAST BY THE OUTER ANGLE AGAINST THE FLAT BACK IS STRONG AND REGULAR



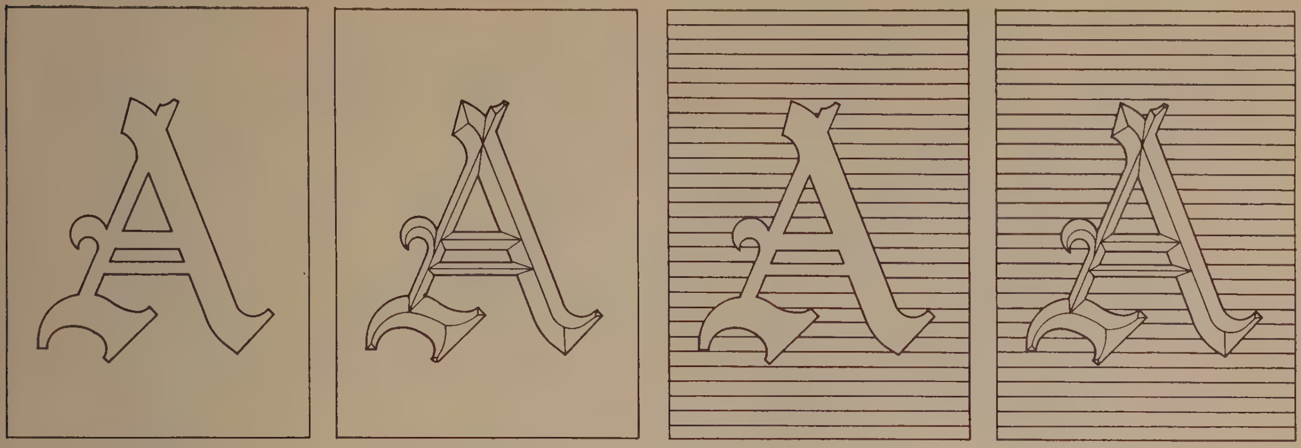
RAISED LETTERS WITH ROUNDED OR MOLDED FACES CAST UNEVEN SHADOWS CAUSING THE LETTERS TO APPEAR DISTORTED



RAISED LETTERS WITH FLAT FACES AND SQUARE SHOULDERS CAST SHARP SHADOWS ON THE WALL THUS MAKING THE LETTERS STAND OUT CLEARLY

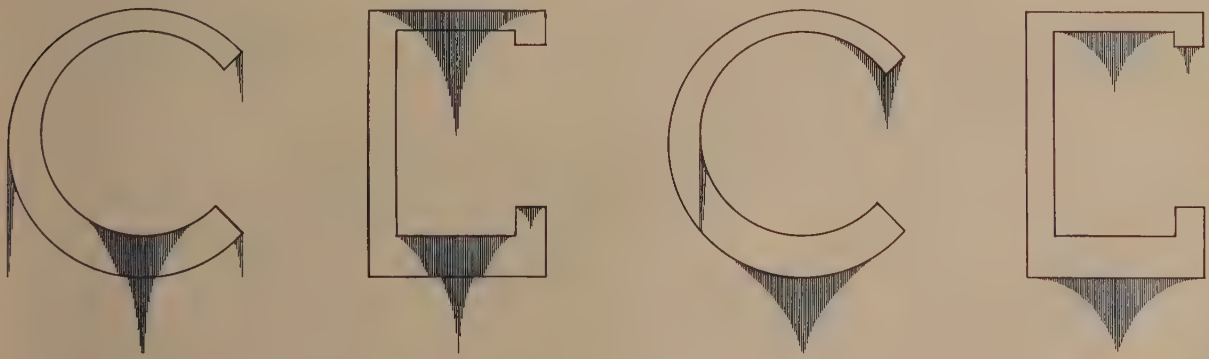


RAISED LETTERS WITH SQUARE SHOULDERS, FLAT BACK AND FLAT FACE - FLUSH WITH FACE OF WALL ARE EASY TO FORM AND CAST A STRONG REGULAR SHADOW



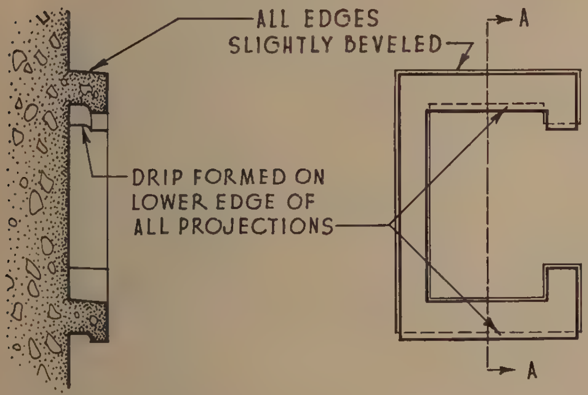
FLAT FACED LETTER LINE FACED LETTER FLAT FACED LETTER LINE FACED LETTER

WITHOUT THE AID OF SHADOWS THE LINE FACED LETTER SHOWS MORE CLEARLY AGAINST A SMOOTH BACKGROUND THAN A SMOOTH, FLAT FACED LETTER. BUT AGAINST A BACKGROUND OF CONTRASTING TEXTURE THE SMOOTH FLAT FACED LETTER STANDS OUT MORE CLEARLY THAN THE LINE FACED LETTER



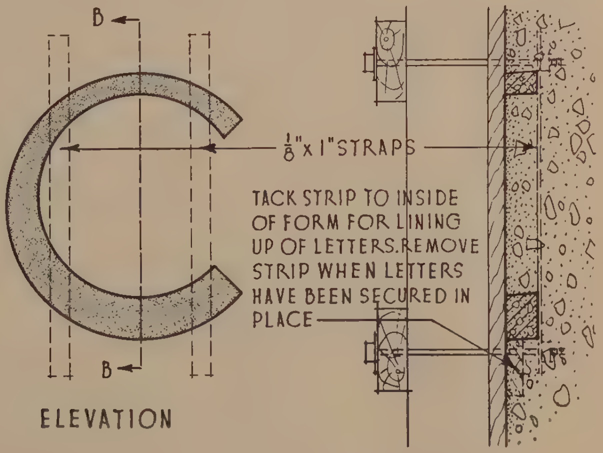
RAISED LETTERS INCISED LETTERS

THE EFFECT OF MOISTURE STREAKING ON RAISED AND INCISED LETTERS IS TO CHANGE THE SHAPE FROM THAT DESIGNED



SECTION A-A ELEVATION

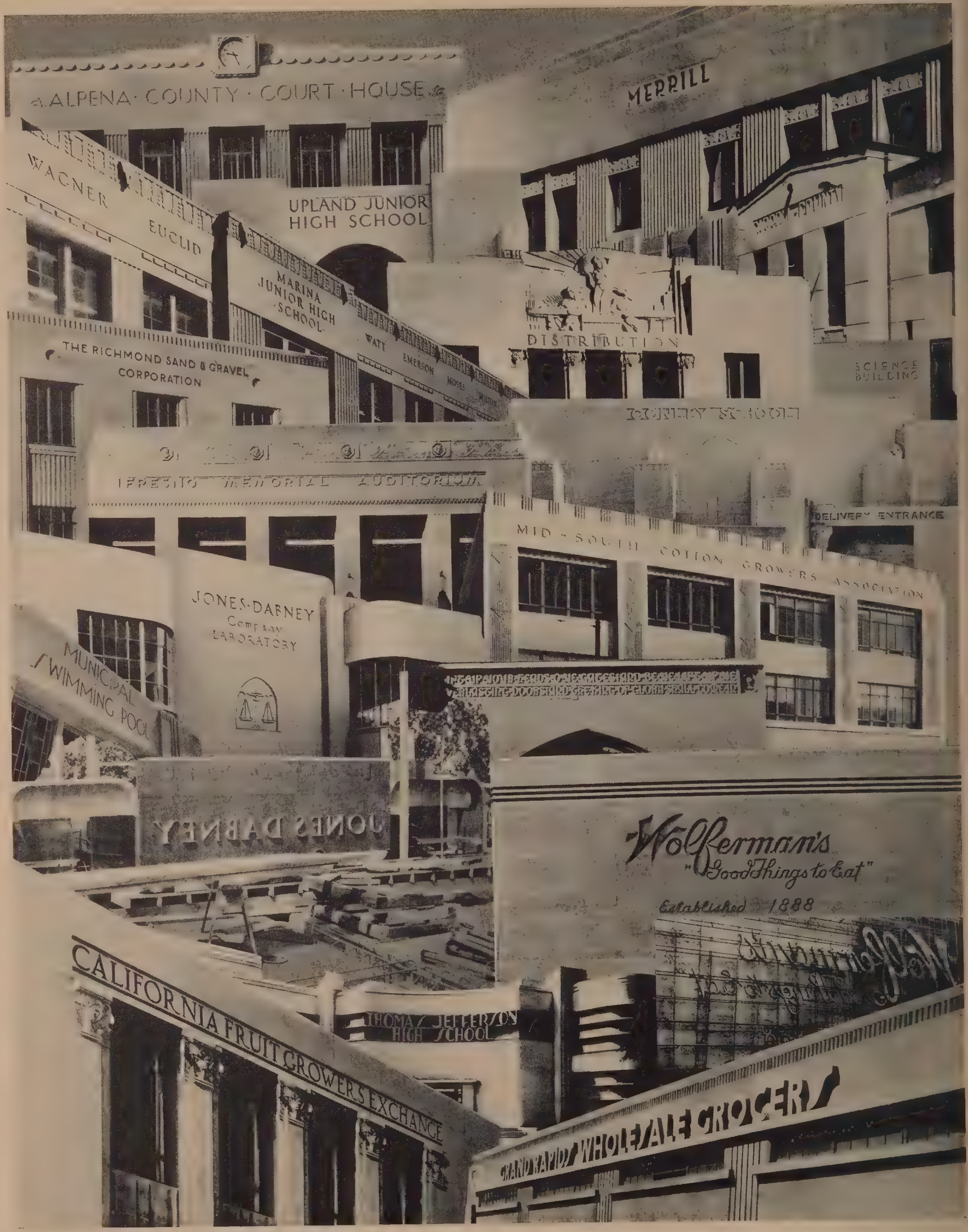
TO CORRECT LETTER DISTORTION FROM MOISTURE STREAKING PROVIDE A DRIP ON ALL LOWER EDGES OF RAISED LETTERS CAUSING THE MOISTURE TO FALL FREE OF THE WALL BELOW



ELEVATION

SECTION B-B

PRECAST LETTERS OF CONTRASTING COLOR SET IN FORMS FLUSH WITH WALL SURFACE STAND OUT CLEARLY WITHOUT THE AID OF SHADOWS AND WILL NOT CAUSE MOISTURE STREAKING


ALPENA COUNTY COURT HOUSE
MERRILL
WAGNER
EUCLID
UPLAND JUNIOR HIGH SCHOOL
MARINA JUNIOR HIGH SCHOOL
WATT
EMERSON
HOSEA
THE RICHMOND SAND & GRAVEL CORPORATION
DISTRIBUTION
SCIENCE BUILDING
MEMORIAL AUDITORIUM
DELIVERY ENTRANCE
MID-SOUTH COTTON GROWERS ASSOCIATION
JONES-DABNEY Company LABORATORY
MUNICIPAL SWIMMING POOL
JONES DABNEY
Wolferman's
"Good Things to Eat"
Established 1888
CALIFORNIA FRUIT GROWERS EXCHANGE
THOMAS JEFFERSON HIGH SCHOOL
GRAND RAPIDS WHOLESALE GROCERS

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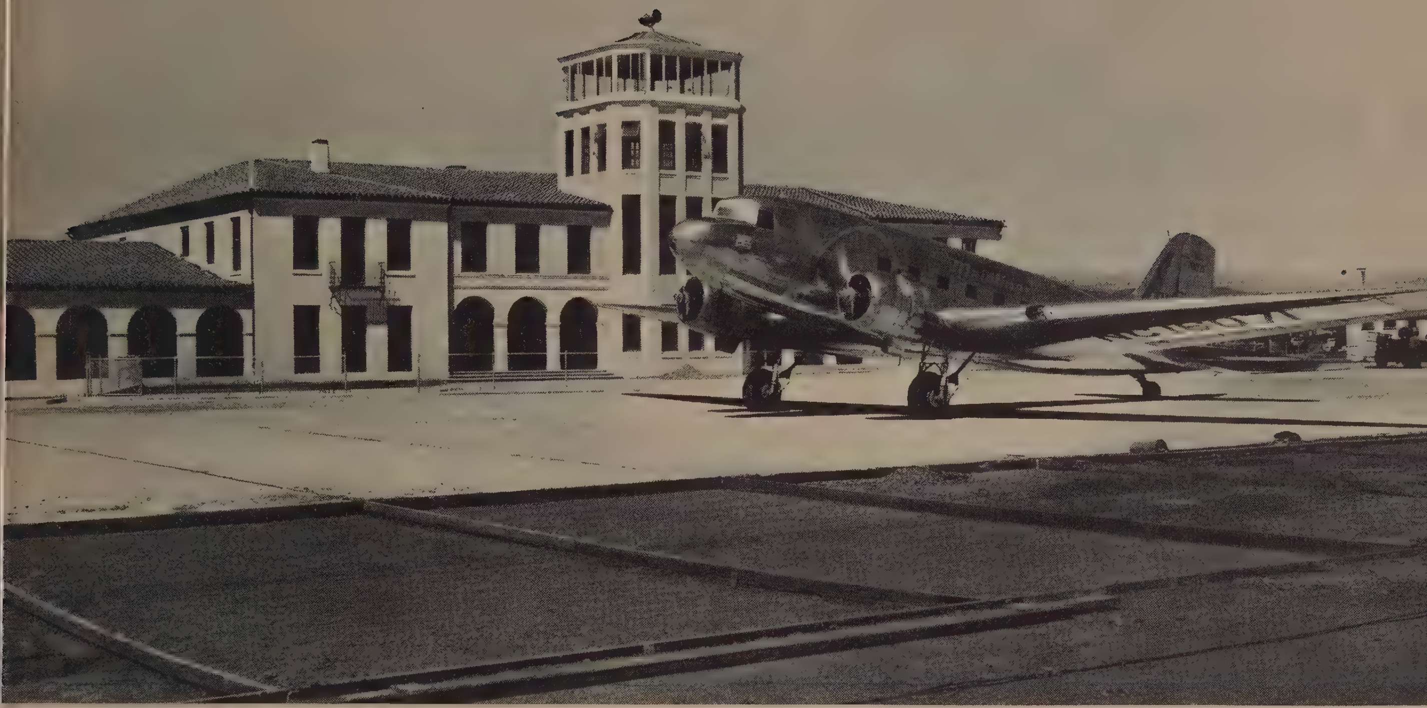


*A transcontinental airliner waits on the apron in front of the new Administration building, first large project completed in San Francisco's comprehensive airport program. Concrete in a modern Spanish style, the building was designed under the direction of George D. Burr, structural engineer of the Public Utilities Commission, City and County of San Francisco.*

# Airport Administration Building

By George D. Burr*

MORE than 16 per cent of all scheduled air passenger, mail and express business originating within the United States is moved through busy San Francisco Airport. The steady growth of this air traffic and increased current demands necessitated immediate construction of the new Administration building as part of the great plan for the San Francisco Landplane and Seaplane Port.

Dignity and richness in appearance, combined with the utmost in utility, efficiency and rapid handling of traffic, were the basic requirements of the design. Since a commercial airport is essentially a public utility that must eventually earn a return on the funds invested, economy in construction cost was important in selection of materials of construction and the medium for architectural expression.

The occupancy dictated the major dimensions and dominant characteristics of the building. How the major functions of the airport affected the design and appearance of the structure may be seen in the three divisions of airport activity:

First: the control of airplane movements to, from and on the flying field necessitated a control tower, meteorological observation platform, weather department office and a maximum of window openings consistent with the Spanish style of architecture chosen for this and all future buildings planned in the Airport development program.

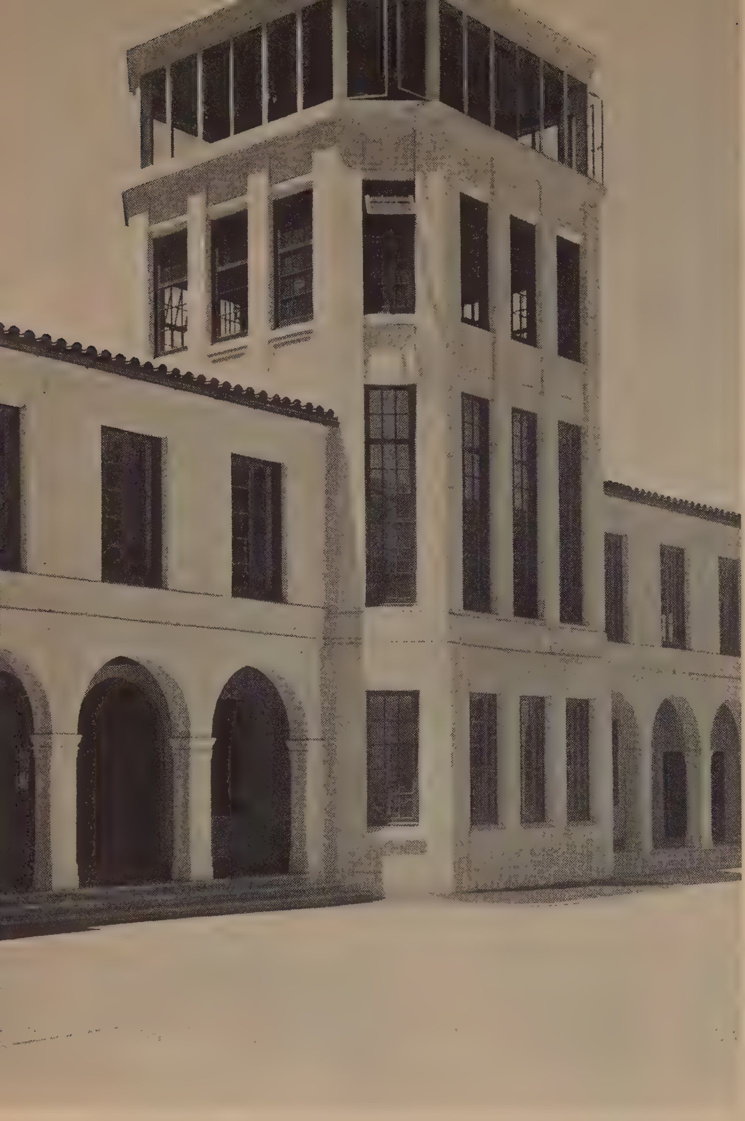
Second: facilities for receiving, sheltering and transmitting air passenger traffic, mail and express required the large main waiting room, ticket counter, telegraph and telephone offices, check room, restaurant, cigar counter, toilets, baggage rooms and other facilities for mail and express.

Third: the administration of the airport called for quarters for field crew, offices for manager and staff, offices for airline operating companies, administration of business allied to air commerce, and government offices.

The elaborate communication system of signals, radio,

---

*Structural Engineer, Public Utilities Commission, City and County of San Francisco.



*Central control tower has a commanding view in all directions. Exposed surfaces of the building are dash-finished concrete, with form marks lending interest to flat areas.*

field lighting and traffic control played an important part in working out the building details.

The structure is 88x206 ft. in plan, with provision for a future 86x66-ft. wing extending north to match the present one-story south wing. The south wing houses baggage and mail-handling facilities and field crew quarters. The main waiting room, 40x80 ft. in plan and extending through two and one-half stories, occupies the central portion of the main building. Here is located ticket counter, telegraph, checking, restaurant and all public facilities as well as passageways to airplanes and buses. Various offices are housed in the second story. The third story of the 25x25-ft. tower is to be occupied by the Federal agency for control of air traffic along the airways, and the fourth story by the field control room. A meteorological observation platform is located in a recessed portion of the roof opening into a meteorological room in the third story over the north portion of the building. A small basement houses heating, mechanical and electrical equipment.

The building is of fire-resistive construction throughout. Foundations are concrete piers supported on deep timber piling which extend through 60 to 90 ft. of soft, plastic blue clay down to firm stratum. All portions of the building, including basement, ground-floor slab and exterior steps, are supported on the piling by slab and beam construction. Structural frame, walls and floors are of reinforced concrete with interior partitions of metal stud and plaster construction. The main roof is Spanish tile. Only steel framing were trusses over the 40x80-ft. waiting room and support for the roof over the control room tower.

A seismic factor of 10 per cent of gravity was used in the structural design. Concrete mixture was based on an assumed minimum 28-day compressive strength of 2,500 p.s.i., using ¾-in. maximum-sized aggregate, except for 3-in. and 3½-in. slabs where ½-in. aggregate was used, and not less than 6½ sacks of cement per cu. yd. of concrete. The average 28-day strength was 4,624 p.s.i. Mechanical vibration was supplemented by hand rodding and puddling in the placing of the concrete.

Full advantage of continuity was taken in design to reduce the size of structural members, and consequently reduce their cost and weight. Limited funds in relation to the demand for space made it necessary to use utmost economy in design. The cost of the building was about $155,000, or 30 cents per cu. ft. and $5.28 per sq. ft. of floor area. To maintain richness in appearance as well as low unit cost, full advantage was taken of the adaptability of concrete as an architectural material.

In general, concrete walls are 7 in. thick in the first story and 6 in. in the second story. To obtain deep reveals

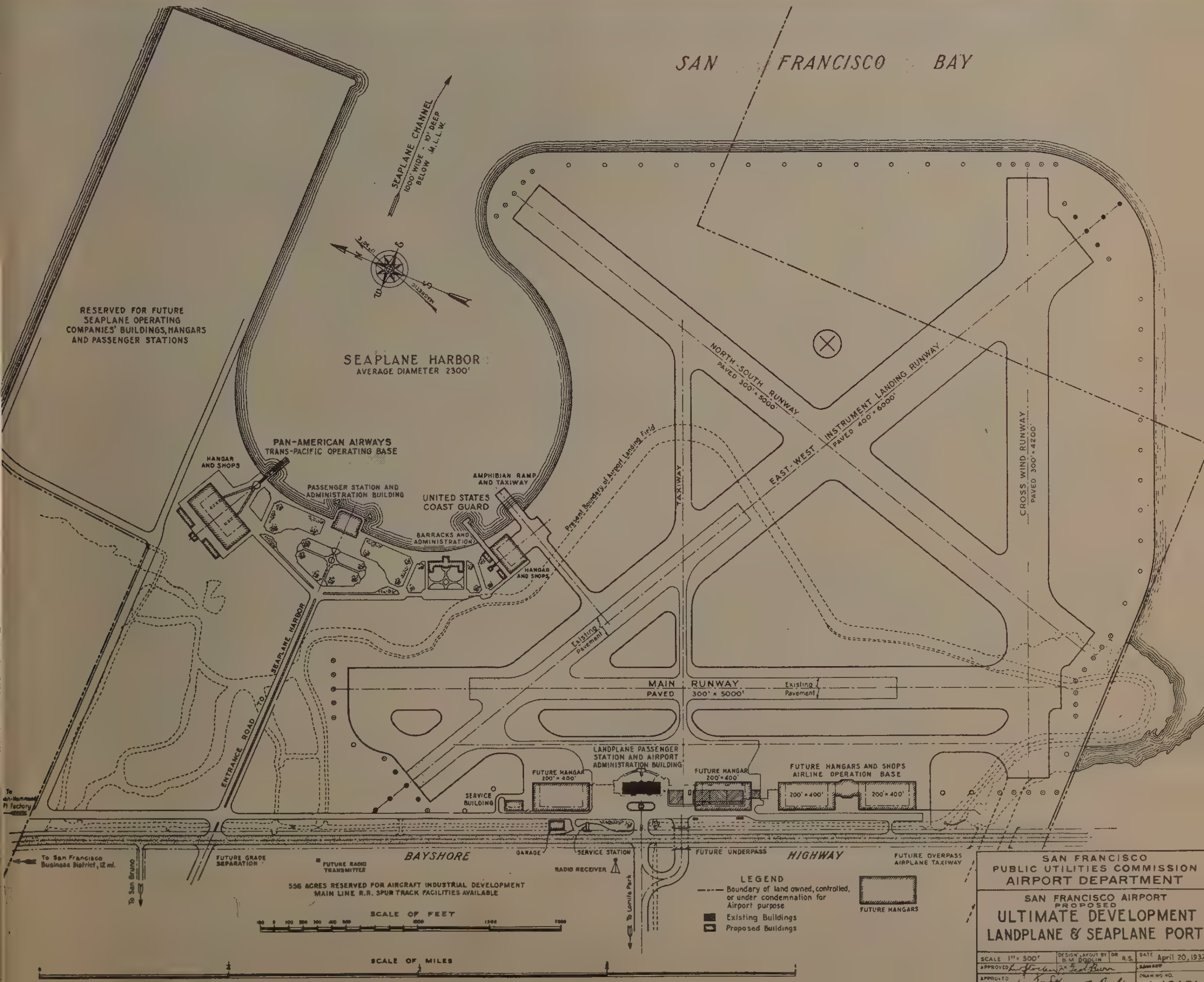
*Consistent in style and construction with the main building is the field lighting building, a pleasant little concrete structure.*

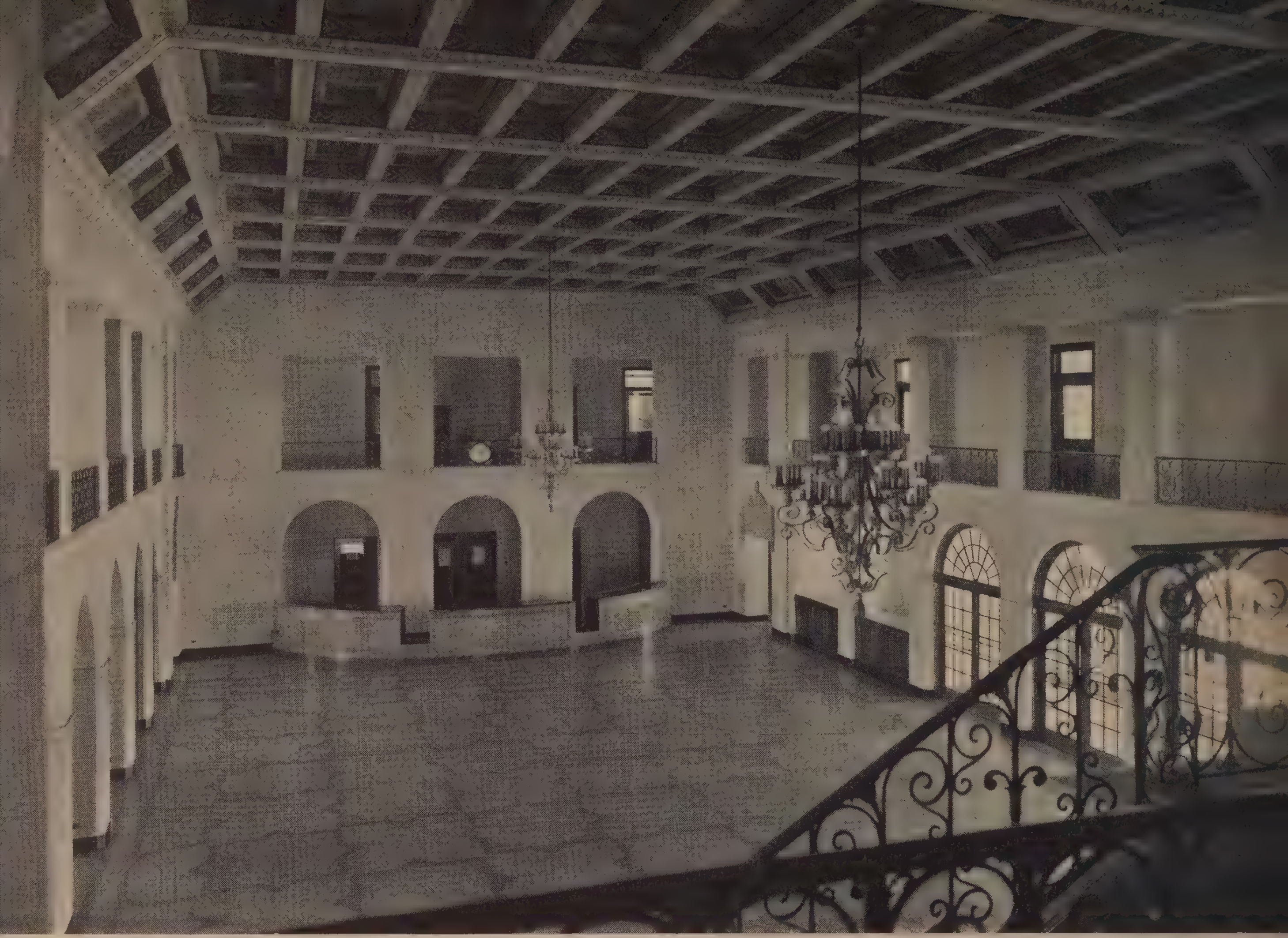
*General view of Administration building from front. Another wing is planned for future construction.*

demanded by the architecture, vertical and horizontal beams were cast in the walls around the inside of the window openings. All reveals, moldings and ornamentation on the outside walls and arcades were set in the forms and cast with the structural concrete. The only finish used on the exterior was a dash coat of pigmented white portland cement and sand.

Forms for the walls were made of surfaced T&G boards, evenly matched and tightly fitted to minimize joint marks. All form joints, except at jamb reveals, were placed horizontally, care being taken to make joint lines truly horizontal and continuous around the building. Decorative detail was cast against milled wood forms.

Construction joints were planned carefully in advance to


SAN FRANCISCO BAY
SEAPLANE CHANNEL 1000' WIDE - 10' DEEP BELOW M.L.L.W.
RESERVED FOR FUTURE SEAPLANE OPERATING COMPANIES' BUILDINGS, HANGARS AND PASSENGER STATIONS
SEAPLANE HARBOR
AVERAGE DIAMETER 2300'
PAN-AMERICAN AIRWAYS TRANS-PACIFIC OPERATING BASE
HANGAR AND SHOPS
PASSENGER STATION AND ADMINISTRATION BUILDING
UNITED STATES COAST GUARD
AMPHIBIAN RAMP AND TAXIWAY
BARRACKS AND ADMINISTRATION
HANGAR AND SHOPS
Present Boundary of Airport Landing Field
NORTH-SOUTH RUNWAY PAVED 300' × 5000'
EAST-WEST INSTRUMENT LANDING RUNWAY PAVED 400' × 6000'
TAXIWAY
CROSS WIND RUNWAY PAVED 300' × 4200'
Existing Pavement
MAIN RUNWAY PAVED 300' × 5000'
Existing Pavement
ENTRANCE ROAD TO SEAPLANE HARBOR
LANDPLANE PASSENGER STATION AND AIRPORT ADMINISTRATION BUILDING
FUTURE HANGAR 200' × 400'
FUTURE HANGAR 200' × 400'
FUTURE HANGARS AND SHOPS AIRLINE OPERATION BASE
200' × 400'
200' × 400'
SERVICE BUILDING
To Pacific Factory
To San Francisco Business District, 12 mi.
To San Bruno
FUTURE GRADE SEPARATION
FUTURE RADIO TRANSMITTER
BAYSHORE HIGHWAY
GARAGE
SERVICE STATION
RADIO RECEIVER
To Lomita Park
FUTURE UNDERPASS
FUTURE OVERPASS AIRPLANE TAXIWAY
556 ACRES RESERVED FOR AIRCRAFT INDUSTRIAL DEVELOPMENT MAIN LINE R.R. SPUR TRACK FACILITIES AVAILABLE
LEGEND
Boundary of land owned, controlled, or under condemnation for Airport purpose
Existing Buildings
Proposed Buildings
FUTURE HANGARS
SCALE OF FEET
SCALE OF MILES
SAN FRANCISCO PUBLIC UTILITIES COMMISSION
AIRPORT DEPARTMENT
SAN FRANCISCO AIRPORT
PROPOSED
ULTIMATE DEVELOPMENT
LANDPLANE & SEAPLANE PORT
SCALE 1" = 300'
DESIGN LAYOUT BY B.M. DOOLIN
DR R.S.
DATE April 20, 193
APPROVED
APPROVED
DRAWING NO.



*Main waiting room, where many a ticket for a 15-hour (or less) cross-country flight will be purchased. Dignity and richness of appearance, with efficient handling of traffic, mark the design of this room.*

avoid detrimental appearance.

The outside steps to the arcades were cast integrally with the structural concrete, with no special finish aside from troweling abrasive material into the treads. The arcade floor finish was placed integrally with the slab and smoothly troweled. This surface was acid stained in bronze-green and brown pattern, with pattern joints ground into the surface. The floor now resembles colored quarry tile.

Ceilings in the arcades are concrete treated only with acid stains in a brown color to simulate weathered redwood. Forms for the ceilings were carefully built with the rough surface of the lumber against the concrete, making certain that single full-width boards were used for sides and soffits of beams. The planks between beams ran transversely to the beam axes.

Waiting room floors, and those of the alcoves and vestibules are in four-color patterned terrazzo. They are rich in tone and have the feeling of fine Oriental rugs.

All architectural, structural and mechanical design and supervision was done under the direction of the writer and under the general direction of L. T. McAfee, Utilities Engineer, L. W. Stocker, Chief Civil Engineer, and B. M. Doolin, Manager of the Airport Department—all of the Public Utilities Commission of the City and County of San Francisco. H. G. Chipier, also of the Commission, was directly responsible for the architectural work.

*A study in arches and California sunshine. The floor is acid-stained concrete, with ground pattern joints; the concrete ceiling is stained to resemble wood beams.*

days which the general contractors, superintendents, concrete foremen, office and field engineers and consulting engineers attended. Formwork, construction joints, concrete mixes and placement were thoroughly studied. At the conclusion of this two-day school and conference, the ways and means of building these plants were decided and agreed upon. Everyone was impressed with the possibilities for the production of pleasing, fine-appearing structures in concrete. The cooperation among the members of the construction staffs is reflected in the completed work.

The two power houses are of somewhat different design. The Monroe plan is 37x131 ft., rising 105 ft. above its foundation. The power house itself acts as a dam as well as power station and is erected in the canal. This made architectural treatment of its upstream side somewhat difficult, since the portion of the wall to be treated was but 21 ft. high. The appearance of the structure was also affected by the water control machinery.

Aggregates available in this region are harsh, and special care had to be taken to assure elimination of honeycomb. Smooth lined forms were used, with joints carefully spaced, concrete was well puddled in the forms and finished by rub-

finished in terrazzo after machinery was installed.

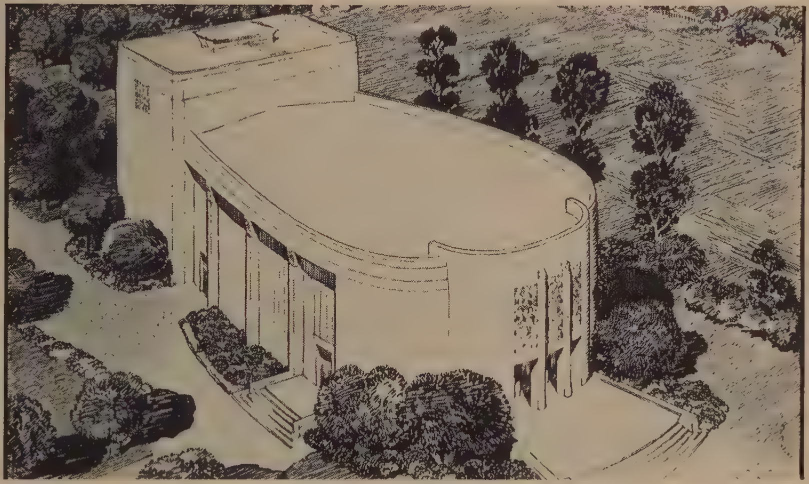
Columbus Power House, larger all around, is 48x164 ft. and 110 ft. high. One of the problems encountered on this job was to unwater the site, although the power house is 4 miles from the river. It was necessary to lower the ground water level 50 ft. during construction and permanently lower the water table 25 ft. Six deep-well pumps were used in lowering the water. Details such as roof and floors are similar to those of the Monroe plant, but elevations are different. Three 20-ft. penstocks enter the rear of the power house and over them a cable tunnel was erected for moving heavy equipment such as transformers from substation to the power house. This required a different treatment for upstream and downstream faces of the building.

Instead of hand rubbing the walls as on the Monroe job, Columbus Power House was finished by power grinders, and a somewhat more satisfactory finish resulted.

Charles B. Fricke is president, and H. Kramer, general manager, of the Loup River Public Power District. Consulting engineers for the development were Harza Engineering Co. of Chicago, Erik Floor, vice-president in charge, and Frank E. Peacock, chief engineer. Monroe Power

*with James T. Taylor, contractor—both of Ft. Worth.*

Above: *Holy Blossom Synagogue, Toronto, Canada, designed by Chapman and Oxley, architects, and now being built by Dickie Construction Co., Ltd.*



Right: *King City Union High School Auditorium, King City, California, designed by Robert Stanton, architect, Del Monte.*

Below: *Project for reinforced concrete bath house at Macon, Missouri. Designed by Irwin Dunbar, Kirksville, Mo., architect, it is being built by WPA.*

*of reinforced concrete, walls were [illegible] for the Loup River project.*

# Loup River Power Plants

By F. E. Peacock*

TWO power plants, major units in the $8,700,000 development of the Loup River Public Power District, have been completed this year. The District, organized under the laws of the State of Nebraska for the development of power only, secured water rights for the diversion of 3,000 second-feet of water from the Loup River west of Genoa, Neb., with return of water to the Platte River just below the junction of the Loup with the Platte. The project is financed by PWA.

The natural drop of the river from intake to discharge weir is 162 ft. A canal about 35 miles long was built having a much flatter slope than the river, so that 144 ft. of head is developed for power purposes. Owing to the contour of the terrain, it was necessary to build two power drops instead of one, which naturally would have been less expensive. One power drop of 32 ft. was located a mile north of Monroe, and a second, greater drop of 112 ft. at a point 3 miles northeast of Columbus.

The Monroe Power House, located on the canal, has no water storage above it and is therefore what is generally termed a "run-of-river plant." Provision was made to pass water around the power house automatically through a Tainter gate spillway built into the substructure of the building. The plant is provided with three 3,200 h.p. water wheels driving three 2,750 K.V.A. generators. It is automatically float-controlled by headwater level. Control and indication of all operations at the Monroe plant can be directed from the Columbus Power House.

The Columbus Power Plant is located 1¾ miles below a large reservoir which permits the plant to operate as a peak load station, passing 4,800 second-ft. of water. Three water wheels of 18,000 h.p. each operate 14,000 K.V.A. generators.

After the general sizes of these power houses were determined, a consulting architect was employed to design the features of the structures that would make them pleasing to the eye, but with a minimum increase in cost. It is estimated that the increased cost for architectural refinements in the two power houses is but one-fourth of one per cent of the total cost of the buildings.

Before actual construction of the plant superstructures was commenced, a school was held in Columbus for two days which the general contractors, superintendents, concrete foremen, office and field engineers and consulting engineers attended. Formwork, construction joints, concrete mixes and placement were thoroughly studied. At the conclusion of this two-day school and conference, the ways and means of building these plants were decided and agreed upon. Everyone was impressed with the possibilities for the production of pleasing, fine-appearing structures in concrete. The cooperation among the members of the construction staffs is reflected in the completed work.

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*Chief Engineer, Harza Engineering Co.

The two power houses are of somewhat different design. The Monroe plan is 37x131 ft., rising 105 ft. above its foundation. The power house itself acts as a dam as well as power station and is erected in the canal. This made architectural treatment of its upstream side somewhat difficult, since the portion of the wall to be treated was but 21 ft. high. The appearance of the structure was also affected by the water control machinery.

Aggregates available in this region are harsh, and special care had to be taken to assure elimination of honeycomb. Smooth lined forms were used, with joints carefully spaced, concrete was well puddled in the forms and finished by rubbing. The pitched roof is of red cement tile, a style adopted here because a flat roof would have been visible from some of the adjoining land. It also offers a pleasant contrast to the natural-colored concrete walls. The interior floors were finished in terrazzo after machinery was installed.

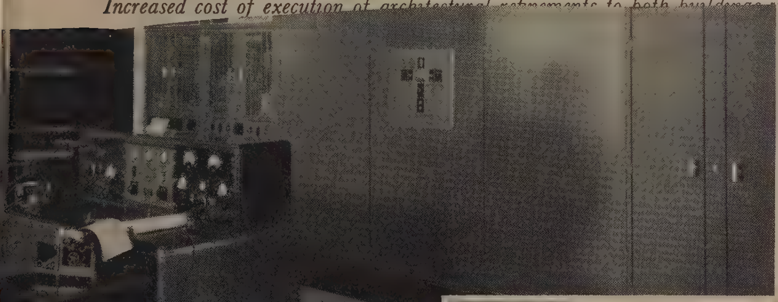
Columbus Power House, larger all around, is 48x164 ft. and 110 ft. high. One of the problems encountered on this job was to unwater the site, although the power house is 4 miles from the river. It was necessary to lower the ground water level 50 ft. during construction and permanently lower the water table 25 ft. Six deep-well pumps were used in lowering the water. Details such as roof and floors are similar to those of the Monroe plant, but elevations are different. Three 20-ft. penstocks enter the rear of the power house and over them a cable tunnel was erected for moving heavy equipment such as transformers from substation to the power house. This required a different treatment for upstream and downstream faces of the building.

Instead of hand rubbing the walls as on the Monroe job, Columbus Power House was finished by power grinders, and a somewhat more satisfactory finish resulted.

Charles B. Fricke is president, and H. Kramer, general manager, of the Loup River Public Power District. Consulting engineers for the development were Harza Engineering Co. of Chicago, Erik Floor, vice-president in charge, and Frank E. Peacock, chief engineer. Monroe Power House was built by W. J. Assenmacher Co., Lincoln contractor. The Columbus plant was built by George W. Condon Co., and Peter Kiewitt Sons Co. of Omaha. Consulting architect was Ralph Oliver of Chicago.

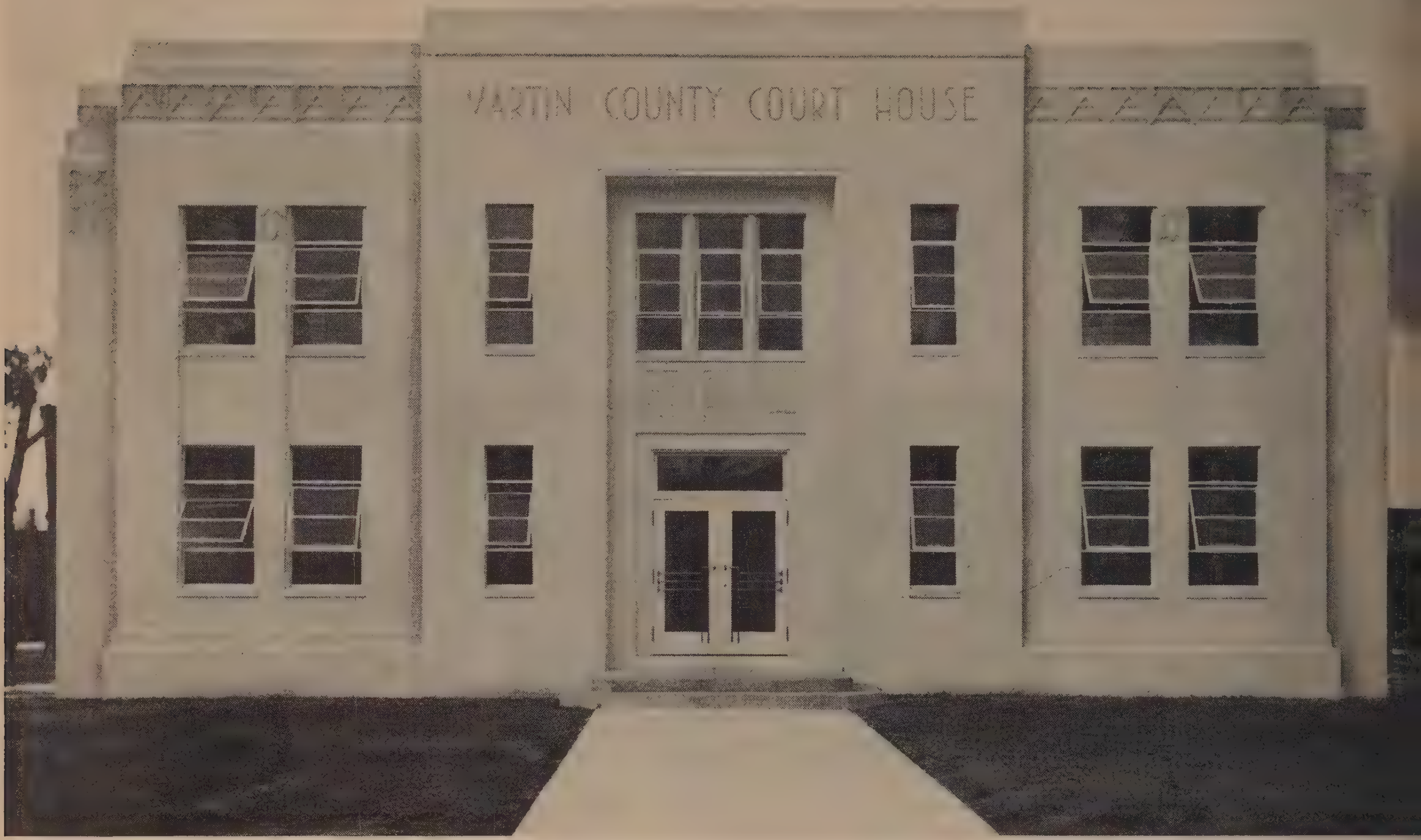
*Developing a greater power load than the Monroe plant, Columbus Power House is the main control station for both plants. Increased cost of execution of architectural refinements to both buildings was but [illegible] per cent of the total cost.*

the owner by means of two signs, cast in place on either side of the entrance and finished in a tone contrasting to the natural concrete walls.



*Black formica banded with aluminum stripping is used on walls of control room and lobby.*

*Simply treated walls and balanced masses characterize this building of definitely contemporary style.*



*This new building, combined with an old concrete school house which was remodeled, forms the new Martin County, Fla., court house. L. Phillip Clarke was the architect and Chalker & Lund Co. of Palm Beach was the contractor. Total cost for new construction and alterations was $29,354.*

# Martin County Gets a Court House

By L. Phillips Clarke, A.I.A.

WHEN Martin County was created by the Florida legislature in 1926, the first requirement was a building to house the seat of the new government, the county offices and the courts—in other words—a county court house. Since counties starting from scratch are not ever burdened with cash, it was impossible to build an imposing structure or even an unimposing structure. Pending accumulation of funds in Martin County treasury, an old concrete masonry grammar school erected 20 years before in the town of Stuart was pressed into service, and while it served well, this makeshift court house was inadequate in space, layout and dignity.

The depression played a mean trick on Martin County's plans to build a new court house, for building fund money was suddenly frozen in a bank that folded up and has remained defunct ever since the bank holidays. Consequently, when the bank released a sizable "dividend" check this summer, the ready cash was put to work at once with aid of a PWA loan, to provide much-needed court house improvements.

First problem was to alter the old structure and erect an addition in permanent construction. Since the old building

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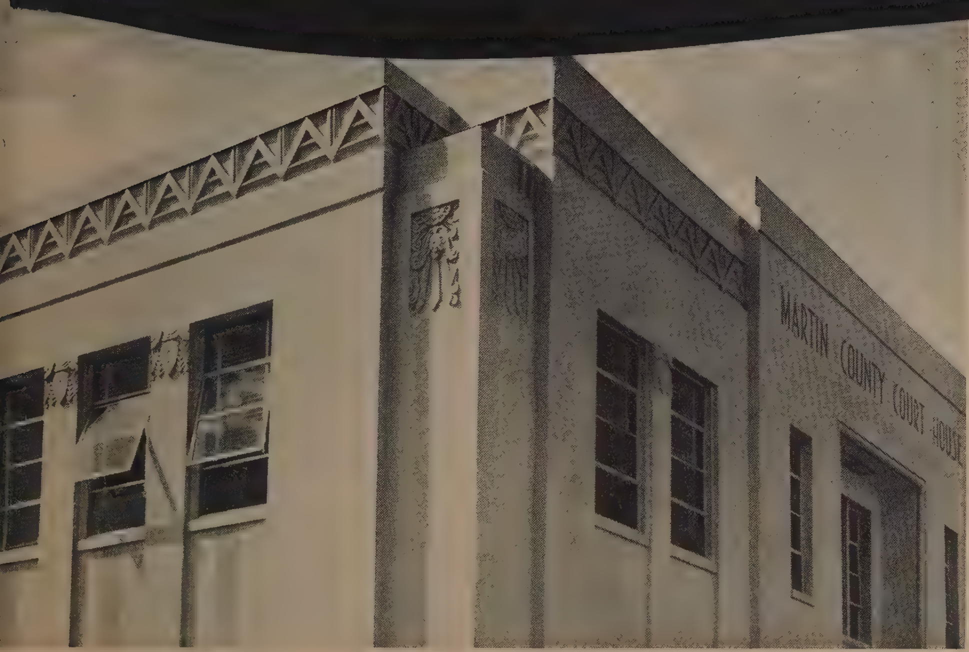
*ted on the Florida east coast*
*h is subject to severe hurri-*
*s, Martin County Court will*
*be used as a storm refuge.*



*Decorative detail was limited to cast stone ornaments inset in the frieze, pilaster caps and panels.*

*Completion of West Inci*
*ator, one of two similar p*
*ects, gives Columbus, O*
*a completely new system*
*refuse disposal. An all-c*
*crete building, it was*
*signed by Edward A. Rams*
*architect, and Paul*
*Maetzel, chief engineer for*
*City of Columbus. Mor*
*Boulger Destructor Co.,*
*New York City, and Robe*
*H. Evans & Co., Columbu*
*were contractors.*

# West Incinerator—Columbus, Ohio

By Edward A. Ramsey, Architect

AMONG the projects in the ten-million-dollar public works program voted by the city of Columbus, Ohio, in 1933, are two incinerators which replace a garbage reduction plant used prior to this time. The sites selected for the new plants were located so that one might serve the central, eastern and southern parts of the city, and the other the north and west sections. In keeping with their locations, the plants are known as the Central and West Incinerators, the former being completed in the fall of 1935 and the West Plant a year later.

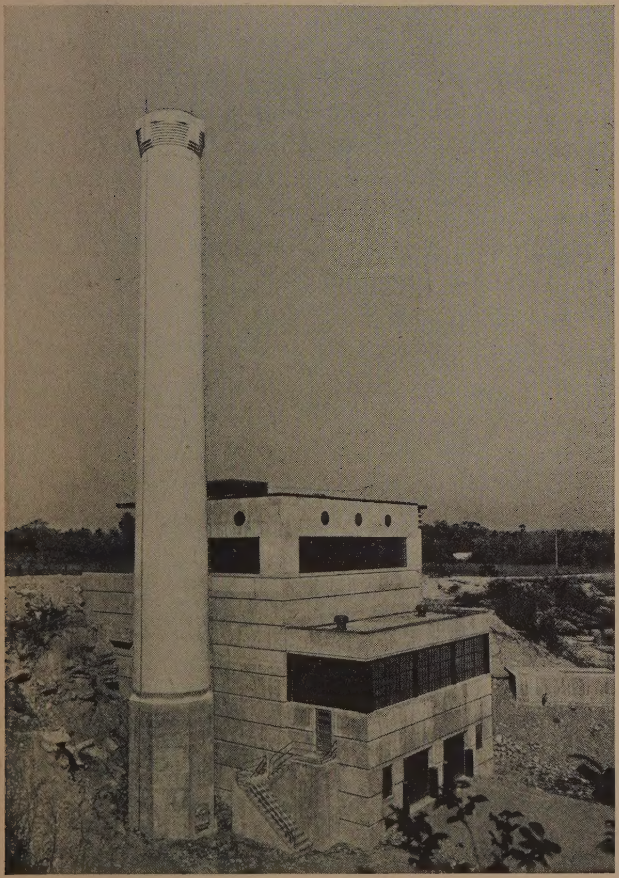
The project was designed in the Division of Engineering and Construction of the City of Columbus, under the direction of Paul W. Maetzel, chief engineer. The writer was architect, and Edward G. Gibson, structural engineer. The work was carried on as part of the city's PWA program under the supervision of L. A. Boulay, state director of

PWA for Ohio. The general contractor was Morse Boulger Destructor Co. of New York City, and Robert H. Evans & Co. of Columbus was sub-contractor for the building.

Due to a change in the method of refuse disposal from reduction to incineration, a new system of collection was adopted. Instead of being concerned only with bulk garbage, the new collection plan includes such burnable refuse as paper, rags, boxes and broken furniture, and householders are urged to wrap kitchen garbage in paper or bags to aid in disposal operations. This situation naturally required education of the public in a new method of handling and setting out garbage and combustibles, and some time has been necessary to effect the change. Consequently, until the new system is completely established, the West Incinerator is used as a standby station in case of trouble at the Central plant; but it is expected that more use of the West plant will be made as quantities of rubbish collected increase.

West Incinerator houses a refuse furnace with a rated capacity of 100 tons per 24 hours.

The building is located in an abandoned limestone quarry with the north face of the structure abutting the quarry wall. Refuse is brought in slightly above natural grade at the top of the quarry and dumped onto a storage floor in the building 8 ft. below. From here it is fed by hand into hoppers which drop it into the furnace from above. Waste materials are destroyed in the furnace, and ashes and clinkers developed are dropped into another set of hoppers which open into a basement at the bottom of the quarry. Ashes are removed in trucks and disposed of by dumping.



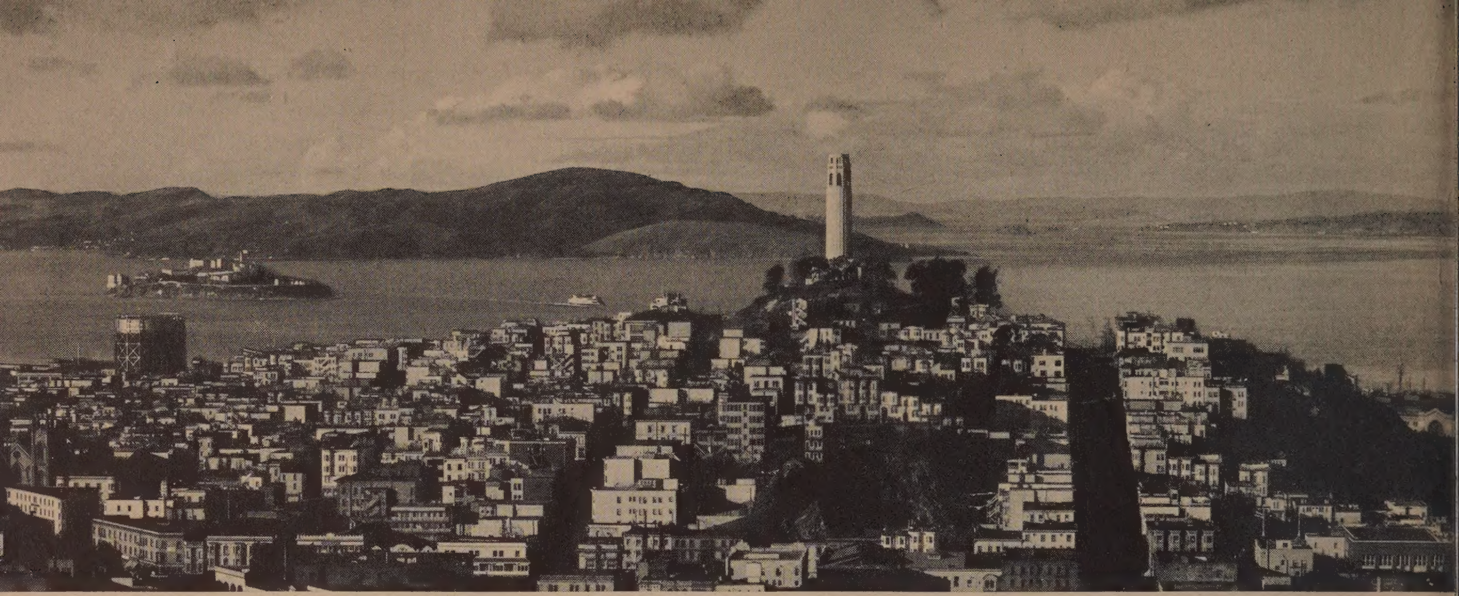
*One wall of the building is cast directly against the wall of an old quarry. Refuse is dumped from ground level above, and ashes are removed from the lowest level.*

In selecting a material for the building, consideration was given to the necessity of erecting a large portion of the exterior walls directly against the rock walls of the quarry. This indicated the use of concrete as the most adaptable and economical material. Concrete was further favored because of the need for strong, serviceable floors. Knowledge that architectural concrete was adaptable to pleasing design treatment resulted in the decision to use reinforced concrete throughout, including walls, floors and roof.

The contemporary style chosen for the architectural design was felt to be most fitting for a type of building whose purpose was to house a sanitary service directly connected with modern civilization and without historic precedent. Accordingly, plain, smooth-formed concrete was used for the walls with factory type windows of steel sash and pivoted ventilators for all openings. Terra cotta discs in the exterior walls near the roof, and horizontal rustications in which construction joints are located, are the only ornamental motifs used, although a stairway on the exterior, extending from the basement to the office on the uppermost level, adds interest to the design.

Transit-mixed concrete was used throughout the project. City inspectors at the concrete plants checked the quantities of cement, aggregates and water going into all batches, with the result that complete control of mixtures was assured. Tests of cement, aggregates and concrete cylinders were made at the City Laboratory. Maximum water allowed in concrete for the West Incinerator was 6¾ gal. per sack of cement. The quantity actually used in construction averaged about 6 gal., the methods of handling and the use of vibration making it preferable for the contractor to use a comparatively dry mix.

The floors of the building are of beam and solid slab construction. Reinforcing steel in the walls amounts to two-tenths of one per cent. Concrete was brought to the site in trucks, hoisted or transferred by crane to a secondary hopper and thence hauled in buggies to the point of placement. Both steel and masonite form liners were used, all being well oiled before concreting. Construction joints are 4 ft. apart in the walls. A pleasing finish was obtained by rubbing after which the concrete was thoroughly cured. There was no other finish treatment.



*Overlooking both the bay and the city from its eminence on Telegraph Hill stands San Francisco's Coit Memorial Tower. Arthur Brown, Jr., architect, conceived the structure as an observation tower, a sturdy shaft of modern lines.*

# Coit Memorial Tower—San Francisco

ALTHOUGH it is no longer new in the maze of current construction, wide interest clings to San Francisco's Coit Tower because of its most appropriate use of memorial building funds. When it became known more than five years ago that a sum was available for a memorial structure on famed Telegraph Hill, there was much discussion and argument over the type of building that should be erected. Some envisaged a low, horizontal mass, others a huge statue, while still others suggested replicas of famous shafts and monuments. After consideration, these were discarded in favor of the simple tower motif used.

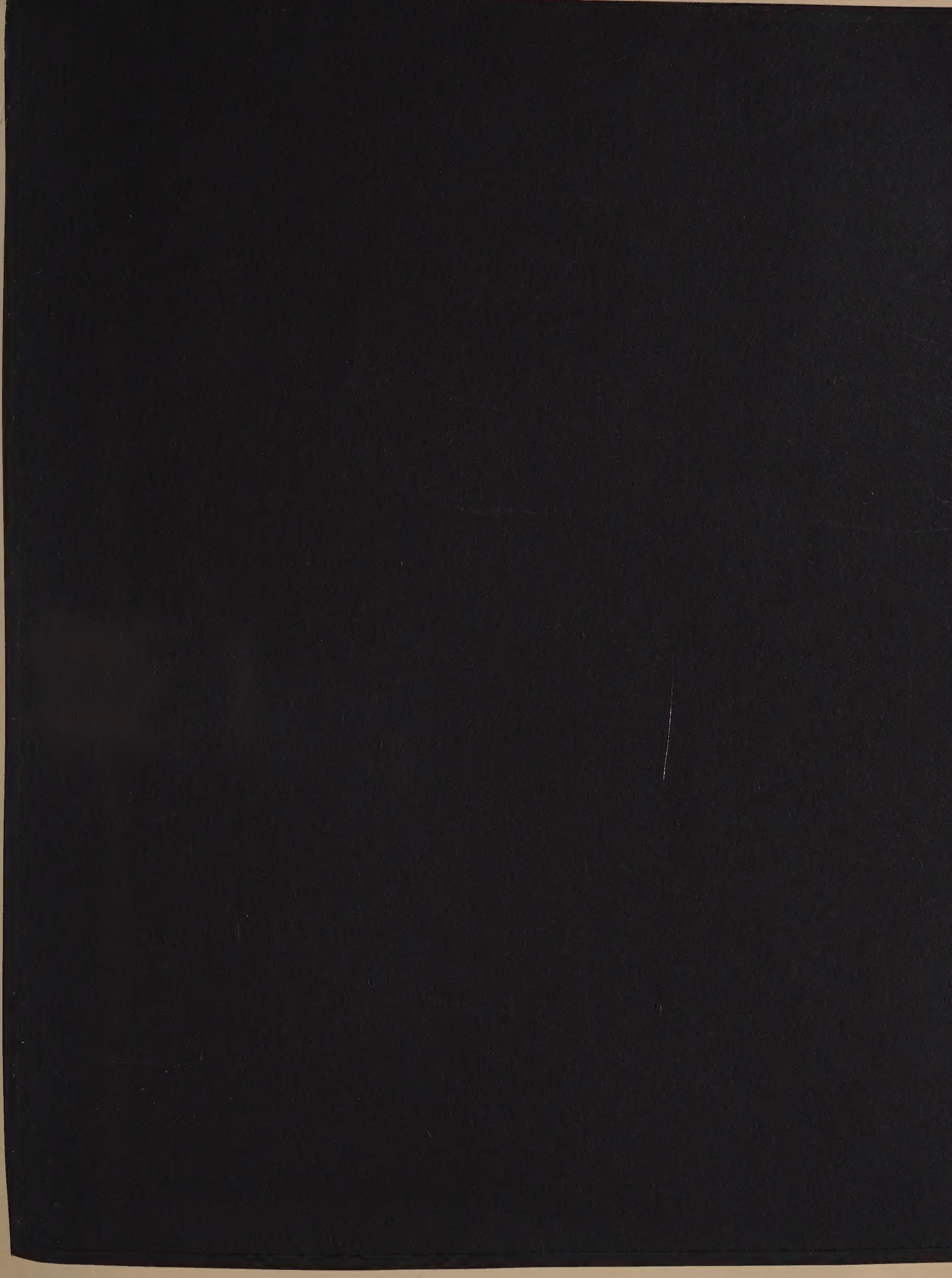
Telegraph Hill has always been a point of vantage either for signal purposes or gaining an impressive panoramic view. Why not, it was reasoned, emphasize the advantages of the Hill and erect an observation tower as high, as commodious and as beautiful as funds permitted?

With the idea of a utilitarian plan abandoned, architect Arthur Brown, Jr., was faced principally with a problem of esthetic design. There were difficulties, naturally, due to the clear visibility of the structure from all sides, and its location at the apex of a commanding eminence. It was desirable that its profile be identical from every side, yet it was necessary to take into account the foreshortening effect obtained from nearby, steep approaches and the elevation effect from greater distances. The solution was a rounded tower set upon a massive base, with a group of superimposed simple round arches and columns at the lantern level.

To keep within the limits of the memorial fund, but to achieve the full effects of the adopted design, precluded the use of costly building materials. With mass and texture a principal characteristic of the design, and elaborate detail minimized, nothing could better express the feeling and purpose of the structure than architectural concrete which is so adaptable to simple, bold forms and integral texture.

Lights and shadows, which play the main theme of the tower, are modulated from straight lines and intersecting planes at the base to definite rounds and curves at the top. The board-formed concrete of the base was given a rough dash coat of stucco. The rounded tower walls were formed as broad shallow flutes. The rough texture is maintained on all surfaces except that of the molded decorative detail over the entrance.

Completed early in 1933 at a cost of $125,000, Coit Tower became immediately popular with the citizens of San Francisco, and visitors who daily seek its height to view the great city below on one side and the bay on the other. An ample passenger elevator carries them from a comfortable lounge in the base structure to the observation point. A battery of 48 floodlights illuminates the tower at night making it a stately, brilliant beacon visible for miles around.



*From a massive base of many intersecting planes, the tower rises as a round, fluted shaft and terminates in a lantern formed of many arches. The base was given a light dash coat of stucco.*

Beauty, because concrete is adaptable to any design, lends added character and distinction. Economy, because modern methods of construction permit walls and

33 W. Grand Ave., Chicago, Ill.

A national organization to improve and extend the uses of concrete through scientific research and engineering field work.

## Architectural Concrete

ARCHITECTURAL AND STRUCTURAL FUNCTIONS COMBINED IN ONE FIREPROOF, WEATHER-DEFYING MATERIAL